

INSECTS OF MICRONESIA
PSOCOPTERA

BY

IAN W. B. THORNTON, S. S. LEE, AND W. D. CHUI

ANOPLURA, SUPPLEMENT

BY

NIXON WILSON

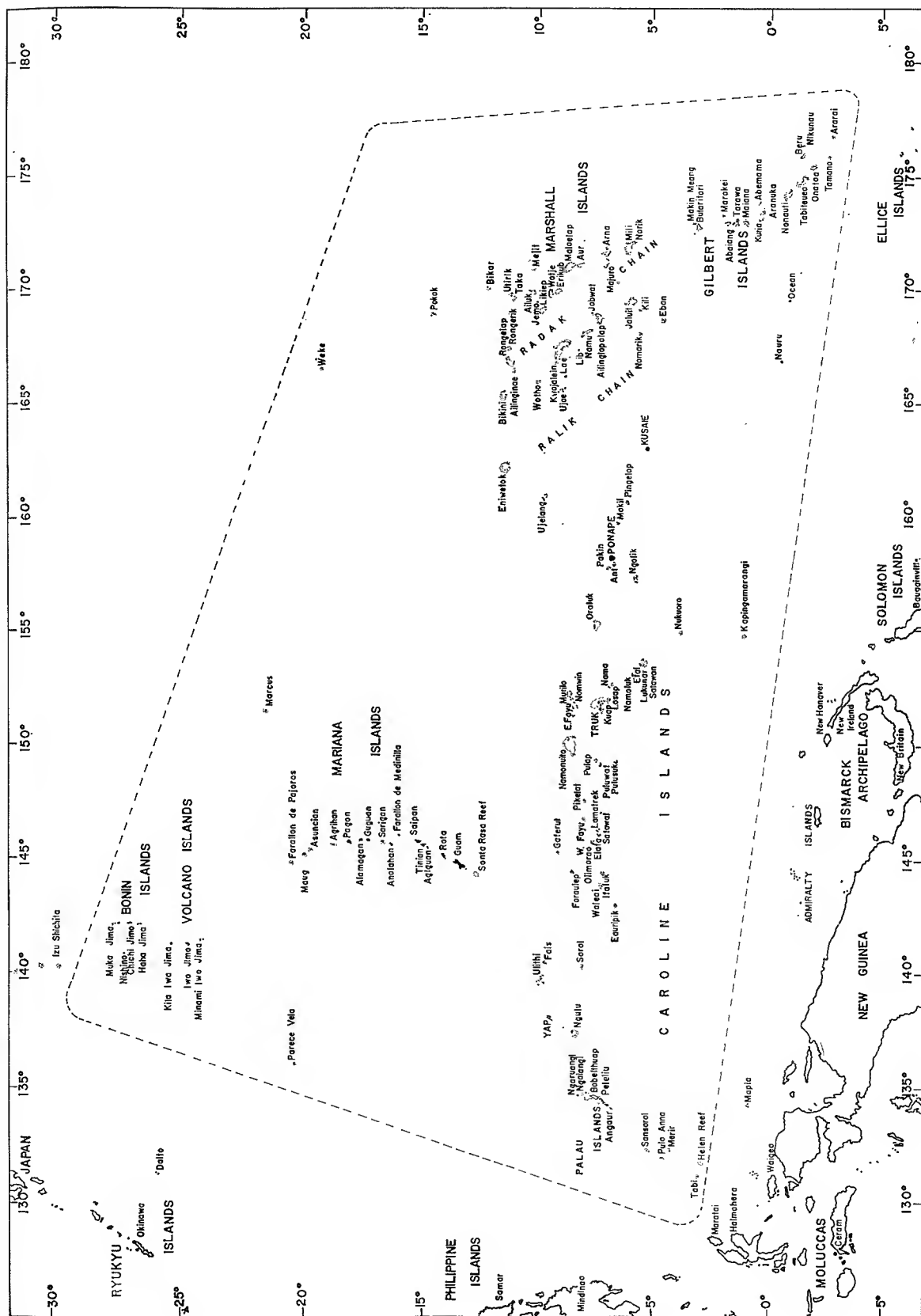
BERNICE P. BISHOP MUSEUM
INSECTS OF MICRONESIA
VOLUME 8, NUMBER 4

HONOLULU, HAWAII
PUBLISHED BY THE MUSEUM
1972

Printed by Kyourinsha Press

This book was published with the financial assistance of the
National Science Foundation (GN-160), to which the
Trustees of Bishop Museum wish to express
their appreciation.

Issued 20 August 1972



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INSECTS OF MICRONESIA

Psocoptera

By IAN W. B. THORNTON*, S. S. LEE, and W. D. CHUI.

INTRODUCTION

Some psocids occur in cryptic habitats such as leaf litter, termitaria, birds' nests, caves, under bark and dead logs, and in domestic situations and stored products; many of these species are apterous. Some have been recorded on rats and on birds—presumably these were casual wanderers inhabiting the nests. Most Psocoptera, however, occur on rocks or on the trunks, twigs and leaves of trees and shrubs; these are usually fully winged forms.

They feed mainly on microflora and organic debris, such as moulds, rusts, algae, pieces of bark, pollen grains, and insect exuviae. Some have been shown to have distinct food preferences (Broadhead and Thornton, 1955; Broadhead, 1958) either feeding chiefly on lichens or on *Pleurococcus* on the twigs of trees. There is evidence, in the case of the lichen feeders, that some species selectively feed on certain parts of the lichen, the fruiting bodies, cropping these to a certain depth. In some arboreal psocids, the distribution of food may lead to pronounced differences in their relative numbers on different tree species (Broadhead and Thornton, 1955; New, 1970).

Those forms which are fully winged are relatively sedentary; many only infrequently take to flight, and then normally fly for only short distances of about one or two meters (Broadhead and Thornton, 1955). On the other hand they are small, light, and have a fairly high surface area to volume ratio, thus being well suited for aerial dispersal. There is some evidence that they take to flight most readily on warm hot days, when warm up-currents are most likely to lift them passively into the upper air. A period of flight activity or aerial dispersal is sometimes an integral phase of the life history (New, 1969).

Some species occur unusually frequently in the aerial plankton (Thornton, 1964; Thornton and Harrell, 1965). These often occur in temporary habitats, and may be fairly widely distributed. They are relatively easily dispersed

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either in the upper air or by man's agencies, and some of them can colonize easily after a successful landfall. These are the psocid "weeds," and they do not usually form endemic complexes after successful establishment in a new area or island, presumably because the frequency of successful landfalls provides sufficient cohesion to maintain the original species gene complex, and divergence from this is thus prevented. Possibly these forms have an "all-purpose" genotype, which enables them to survive in a wide spectrum of ecological situations, again reducing the possibilities of isolation and making speciation less likely to occur.

By contrast, other forms are clearly much less frequently carried in the upper air; moreover, many of these forms are not associated with man and are thus unlikely to be dispersed by commerce. It might be expected, since the chances of these forms achieving subsequent landfalls are very low, and also because of their relatively limited normal flight range, that endemic species complexes would be evolved fairly readily in environments which are heterogeneous and discontinuous, such as isolated archipelagos; indeed, very large endemic complexes of such psocids do exist in the Hawaiian Islands, and somewhat smaller ones in Madagascar (Smithers, 1964; Badonnel, 1967), the Fiji Islands (Lee and Thornton, 1967) and probably also in the Galapagos archipelago. Those forms which make up endemic complexes, at least in the Hawaiian archipelago, have quite restricted ecological tolerances and exist in small, localized populations.

Micronesia (frontispiece) consists of groups of archipelagos made up of high islands and low coralline atolls, and, as would be expected, psocids falling into both the above categories occur within this area of the Pacific.

This work is a report on a number of collections made in Micronesia since 1938 and loaned to the senior author by the B.P. Bishop Museum. The psocid fauna of the area is described, and its relationships and affinities discussed as far as is possible in the present state of knowledge. The psocid fauna of a number of possible source areas such as the Philippines and the Papuan sub-region is unfortunately inadequately known at the present time, and a true assessment of the faunal affinities with these areas cannot therefore be provided until this situation is improved.

The United States Office of Naval Research, the Pacific Science Board (National Research Council), the National Science Foundation, and B.P. Bishop Museum have made this survey and the publication of the results possible. Field research was aided by a contract between the Office of Naval Research, Department of the Navy, and the National Academy of Sciences, NR 160-175.

The collections are deposited in the U. S. National Museum (US), B.P. Bishop Museum (BISHOP), Field Museum in Chicago (FM) and in Kyushu University, Fukuoka, Japan (KU).

ACKNOWLEDGEMENTS. We wish to thank the authorities of Bishop Museum, Honolulu, for making available to us collections of Psocoptera in their care. Acknowledgements are also due to the following collectors: P. A. Adams, J. W. Beardsley, R.M. Bohart, G. E. Bohart, E. H. Bryan, Jr., C. F. Clagg, J. F. G. Clarke, H. S. Dybas, T. Esaki, S. A. Edgar, F. R. Fosberg, J. L. Gressitt, R. J. Goss, E. Hagen, N. L. H. Krauss, I. La Rivers, A. R. Mead, B. D. Perkins, G. D. Peterson, R. W. L. Potts, C. W. Sabrosky, F. M. Snyder, O. H. Swezey, H. K. Townes, L. D. Tuthill, R. L. Usinger, H. S. Wallace, K. Yasumatsu, and S. Yoshimura.

METHODS

The collections used in this study comprise both dry-mounted and alcohol-preserved specimens. The latter are the more useful, except for the scaly winged families, in which both methods of preservation are necessary. Psocids are soft-bodied, and shrivel and distort when preserved dry, necessitating laborious softening before genitalic dissections can be attempted. On the other hand, the scaly-winged forms lose their scales in alcohol so that the wing pattern formed by the scales cannot be known unless dry specimens of the species concerned are also available for study. There is a fading of coloration of almost all psocids as a result of long storage in alcohol.

Dry-mounted specimens were softened by soaking for a few minutes in a dilute solution of detergent until the insect floated free from its card point or could be freed from its pin. Coloration of dry specimens was noted before softening, and where possible both alcohol and dry-preserved specimens were compared. The left hind leg, antenna and right wings were mounted in Euparal on a slide, the abdomen macerated in KOH, stained in acid fuchsin, cleared in Euparal Essence, and the genitalia dissected in Euparal and mounted on a slide. Where possible, wings of scaly-winged forms were examined both dry (for scale pattern) and in alcohol (for venation and membrane pigmentation). Drawings were made with the use of a microprojector.

The family classification, with few exceptions, is that of Badonnel (1951) and a conservative attitude to genera is maintained throughout.

In the taxonomic treatment the full Micronesian distribution of species is provided, including all data provided by collectors. Nomenclature of wing veins follows that of Badonnel (1951) except that "rs" is preferred to "rr." Nomenclature of genitalia follows that of Badonnel (1956).

HISTORICAL

The only published work on Micronesian psocids is that of Banks (1942)

who studied, without dissection, collections made by Usinger and Swezey on the island of Guam. Thirteen species were recorded, and these are accepted below at face value, unless there is good evidence for rejection. The records of *Psocus kauaiensis* and *Ectopsocus hawaiiensis* are not accepted, and those of *Psylloneura simbangana*, *Peripsocus suffitus* and *Myopsocus bakeri* are regarded as questionable.

Gressitt (1954) gave the estimated psocid fauna of Micronesia as 40 species. The present work deals with 90 species (the family Liposcelidae has not been treated). The reader is referred to Gressitt (1954, p. 193) for comments on the coverage and type of collecting by field workers up to 1954. As far as Psocoptera are concerned, by far the largest and richest collection was made by Dybas on Saipan and Tinian in the Southern Marianas. This probably genuinely represents a richer fauna than other island groups, although Dybas' collecting methods may have been more efficient for psocids than those of some other workers. It is likely therefore that species not recorded from the Southern Marianas but recorded from elsewhere in Micronesia are genuinely absent from the Southern Marianas. The reverse situation probably does not have the same degree of significance.

ZOOGEOGRAPHY

The distribution of species within Micronesia and elsewhere is shown in Table 1.

The known fauna of Micronesia now comprises 90 species in 25 genera, giving an average number of species per genus of 3.6. This is considerably higher than that for continental islands such as Great Britain, Taiwan, Hong Kong, the Philippines and Japan (Table 2). It is lower than the figure for Madagascar, (Badonnel, *in litt.*), which has probably been isolated from Africa since the Eocene, and where there has been considerable speciation of the genus *Amphipsocus* (Smithers, 1964). It is very much lower than the figure for the extremely isolated and oceanic Hawaiian archipelago, where explosive speciation has occurred in two lines of psocids.

Of the high island groups, the Southern Marianas have by far the greatest representation (54 species). Next, in order, are Palau (25), Ponape (16), Truk and Yap (14), Kusaie (13), the Bonins (8), Northern Marianas (5), and Volcanos (2). The Marshalls have 16 species represented in the collections; the Gilberts 8. The Caroline atolls have 9 species, and Wake I. and Ocean I. each have 1. This representation shows a fairly good correlation to land areas of these island groups (fig. 1) but appears to be quite unrelated to elevation. The regression of number of species on land area, however,

Table 1. Distribution of Micronesian Psocoptera

	Micronesian Island Groups											Other Localities		
	Bonins	Volcanos	N. Marianas	S. Marianas	Carolines						Gilberts		Wake	Ocean
					Palau	Yap	Caroline Atolls	Truk	Ponape	Kusaie				
Lepidopsocidae														
1. <i>Cyrtophania marginata</i>				×							×			Mangarevas, Samoa, Fiji, Fanning
2. <i>Echmepteryx lunulata</i>	×		×	×	×	×				×	×			Hawaii
3. <i>E. madagascariensis</i> (Kolbe)	×		×	×										Africa, Madagascar, Seychelles, Hong Kong, Kermadecs, Hawaii, Chile, Neotropics
4. <i>E. picticeps</i>				×										
5. <i>E. dybasi</i>				×										
6. <i>E. carolinensis</i>					×	×		×	×					
7. <i>Lepidopsocus maculatus</i>				×										Hawaii
8. <i>L. marmoratus</i> (Banks)				×										Hawaii
9. <i>L. pretiosus</i> (Banks)			×	×		×	×		×	×	×			
10. <i>L. pallidus</i>				×										
11. <i>Nepticulomima bothriata</i>					×	×								
12. <i>N. lineatus</i>				×										
13. <i>Soa dahliana</i> End.				×										Bismarck Archipelago
Psoquillidae														
14. <i>Rhyopsocus pandanicola</i>				×							×			
Psyllipsocidae														
15. <i>Psyllipsocus ramburii</i>				×										Widespread
Pachytroctidae														
16. <i>Pachytroctes insularis</i>				×										
17. <i>Tapinella formosana</i> End.				×										India, Taiwan, Hawaii
18. <i>T. mariana</i>				×										
19. <i>T. pictipenna</i>				×										Palawan
Caeciliidae														
20. <i>Caecilius analis</i> Banks			×	×					×	×	×			Hawaii
21. <i>C. arotellus</i> Banks				×										
22. <i>C. casarum</i> Bad.				×		×	×				×	×		Africa, Hong Kong, Fiji, Samoa, Hawaii, C. America
23. <i>C. novoguineensis</i> End.	×			×										New Guinea, Fiji, Samoa
24. <i>C. apicatus</i>								×						
25. <i>C. fuscipennis</i>					×	×								
26. <i>C. kraussi</i>							×							

Table 1. Distribution of Micronesian Psocoptera

	Micronesian Island Groups										
	Bonins	Volcanos	N. Marianas	S. Marianas	Palau	Yap	Carolines				Wake
							Caroline Atolls	Truk	Ponape	Kusaie	Marshall
27. <i>C. leuroceps</i>				×							
28. <i>C. marginatus</i>					×						
29. <i>C. marianus</i>				×							
30. <i>C. pseudanalis</i>											×
31. <i>C. trukensis</i>								×			
Philotarsidae											
32. <i>Aaroniella gressitti</i>					×	×			×	×	
33. <i>A. trukensis</i>								×			
34. <i>Haplophallus boninensis</i>	×	×									
35. <i>H. fuscistigma</i>				×							
Lachesillidae											
36. <i>Lachesilla pedicularia</i> (L.)				×							Cosmopolitan
Ectopsocidae											
37. <i>Ectopsocopsis cryptomeriae</i> (End.)				×							Malaya, Hong Kong, Taiwan, Japan, Europe, Hawaii, N. America
38. <i>Ectopsocus briggsi</i> McL.				×							Africa, Australia, New Zealand, N. and S. America, Europe
39. <i>E. fullawayi</i> End.										×	Widespread in Pacific
40. <i>E. maindroni</i> Bad.				×	×				×	×	Widespread
41. <i>E. pumilis</i> (Banks)				×							Africa, India, Hong Kong, N. America
42. <i>E. waterstradti</i> (End.)				×							New Guinea, Java, Borneo, Bismarck Archipelago
43. <i>E. boharti</i> T. and W.	×										
44. <i>E. denervus</i> T. and W.				×	×	×	×	×	×	×	Philippines, Samoa
45. <i>E. fenestratus</i> T. and W.				×							
46. <i>E. marginatus</i> T. and W.				×							
47. <i>E. ornatoides</i> T. and W.	×			×	×		×	×	×	×	Fiji, Samoa, Hawaii
48. <i>E. paraplesius</i> T. and W.							×				
49. <i>E. salpinx</i> T. and W.				×							Malaya, Palawan, Luzon
50. <i>E. separatus</i> T. and W.									×		
51. <i>E. speciosus</i> T. and W.				×							Philippines, New Guinea
52. <i>E. spilotes</i> T. and W.										×	Fiji, Samoa, Hawaii
53. <i>E. thysanus</i> T. and W.				×							
54. <i>E. villosus</i> T. and W.							×	×	×	×	

Table 1. Distribution of Micronesian Psocoptera

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		Bonins	Volcanos	N. Marianas	S. Marianas	Carolines						Wake		Ocean
						Palau	Yap	Caroline Atolls	Truk	Ponape	Kusaie			
Peripsocidae														
55.	<i>Peripsocus ferrugineus</i> T. and W.				×	×	×	×	×				Fiji, Samoa, Hawaii	
56.	<i>P. pauliani</i> Bad.		×		×	×						×	Africa, Malaya, Hong Kong, Philippines, Galapagos	
57.	<i>P. suffitus</i> End.				×								New Guinea	
Hemipsocidae														
58.	<i>Hemipsocus chloroticus</i> Hagen				×	×	×	×		×	×		Ceylon, Vietnam, Borneo, Hong Kong, Java, Philip- pines, Taiwan, Japan, Amami I., Hawaii	
59.	<i>H. roseus</i> Hagen					×			×				Ceylon, Thailand, Philippines, Hawaii, Central America, West Indies	
Pseudocaeciliidae														
60.	<i>Heterocaecilius adamsi</i> L. and T.									×				
61.	<i>H. campanula</i> L. and T.							×		×	×			
62.	<i>H. dybasi</i> L. and T.				×							×		
63.	<i>H. minotus</i> L. and T.					×		×	×	×	×			
64.	<i>Lobocaecilius cynara</i> L. and T.					×								
65.	<i>L. fennecus</i> L. and T.				×	×	×	×		×				
66.	<i>Pseudocaecilius criniger</i> (Perkins)		×			×	×			×			Widespread	
67.	<i>P. marshalli</i> Karny					×							Fiji	
68.	<i>P. tahitiensis</i> (Karny)					×							Society Is.	
69.	<i>Pseudoscottiella ornatus</i> (Banks)					×								
70.	<i>P. bifasciata</i>													
71.	<i>P. circularis</i>								×					
72.	<i>P. clarkei</i>						×							
73.	<i>P. fuscistigma</i>						×							
74.	<i>P. gressitti</i>						×							
75.	<i>P. pallida</i>						×							
76.	<i>P. postica</i>							×						
77.	<i>P. pseudornatus</i>						×							
Archipsocidae														
78.	<i>Archipsocus dybasi</i>					×								

Table 1. Distribution of Micronesian Psocoptera

		Micronesian Island Groups															
		Bonins	Volcanos	N. Marianas	S. Marianas	Palau	Carolines					Gilberts	Wake			Ocean	
							Yap	Caroline Atolls	Truk	Ponape	Kusaie						
																	Marshall
79.	<i>A. spinosus</i>				X												
Myopsocidae																	
80.	<i>Lophopterygella cincticornis</i>				X												
81.	<i>Myopsocus bakeri</i> Banks				X												
82.	<i>M. clunius</i>				X			X									
83.	<i>M. palauensis</i>					X											
84.	<i>M. punctatus</i>				X			X			X						
Psocidae																	
85.	<i>Ptycta angulata</i>				X			X		X	X						
86.	<i>P. maculata</i>									X							
87.	<i>P. marianensis</i>				X												
88.	<i>P. micromaculata</i>	X															
89.	<i>P. nitens</i>					X		X									
90.	<i>P. parvula</i>				X	X											
TOTAL		8	2	5	5	4	25	14	9	14	16	13	16	8	1	1	
ENDEMIC		2	0	0	1	9	8	1	1	5	3	1	0	0	0	0	
% Endemism:		25	0	0	35	32	7	11	36	19	8	0	0	0	0	0	

Philippines

though more significant than that of number of species on elevation, is not significant at the 5% probability level.

The Bonin Islands have 4 of their 8 species widespread in Micronesia, and have 4 species in common with each of the S. Marianas and Palau, 2 with Yap. Two species are endemic to the Bonins, and 1, which has Oriental affinities, is restricted to the Bonins and Volcanos; of the remainder, 2 are cosmopolitan, 2 have distributions restricted to the Pacific, and 1 occurs in New Guinea, Fiji and Samoa.

The Volcanos have but 2 species represented in the collections, one of which has a widespread distribution, the other occurring also only in the Bonins.

The Northern Marianas have 5 species, all of which are widespread in Micronesia. Two of these have wide Pacific distributions, and 1 is practically tropicopolitan.

Table 2. Psocoptera fauna of various islands and island groups

	Genera	Species	Average no. of species/genus
Great Britain	35	68	1.9
Taiwan	36	70	1.9
Hong Kong	40	91	2.3
Philippines	28	70	2.5
Japan	47	125	2.7
Galapagos	16	32	1.8*
Micronesia	25	90	3.6
Madagascar	35	168	4.8**
Hawaiian Islands	23	258	11.2***

*Distinct island sub-populations of some of these species are recognizable.

**Badonnel, *in litt.*

***This figure is 2.2 if only the non-endemic fauna is considered, and 72.0 if only the endemic fauna is considered.

Table 3. Number of species of Psocoptera and endemism on island groups of Micronesia

Island group	No. of species	No. of endemics	% of endemism
Bonins	8	2	25%
Volcanos	2	0	—
N. Marianas	5	0	—
S. Marianas	54	19	35%
Palau	25	8	32%
Yap	14	1	7%
Caroline Atolls	9	1	11%
Truk	14	5	36%
Ponape	16	3	19%
Kusaie	13	1	8%
Marshalls	16	0	—
Gilberts	8	0	—
Wake	1	0	—
Ocean	1	0	—

Of the 54 species from the Southern Marianas, 15 are widespread in Micronesia. Ten species are practically cosmopolitan, 8 are found elsewhere only in the Pacific, 7 occur in the Oriental region and 3 in New Guinea. Within Micronesia, the greatest overlap in species is with the Marshall Islands, 12 of the species widespread in Micronesia occurring in both groups. Apparently 19 species are endemic to the S. Marianas, this island group thus having the second highest percentage endemism in Micronesia (Table 3).

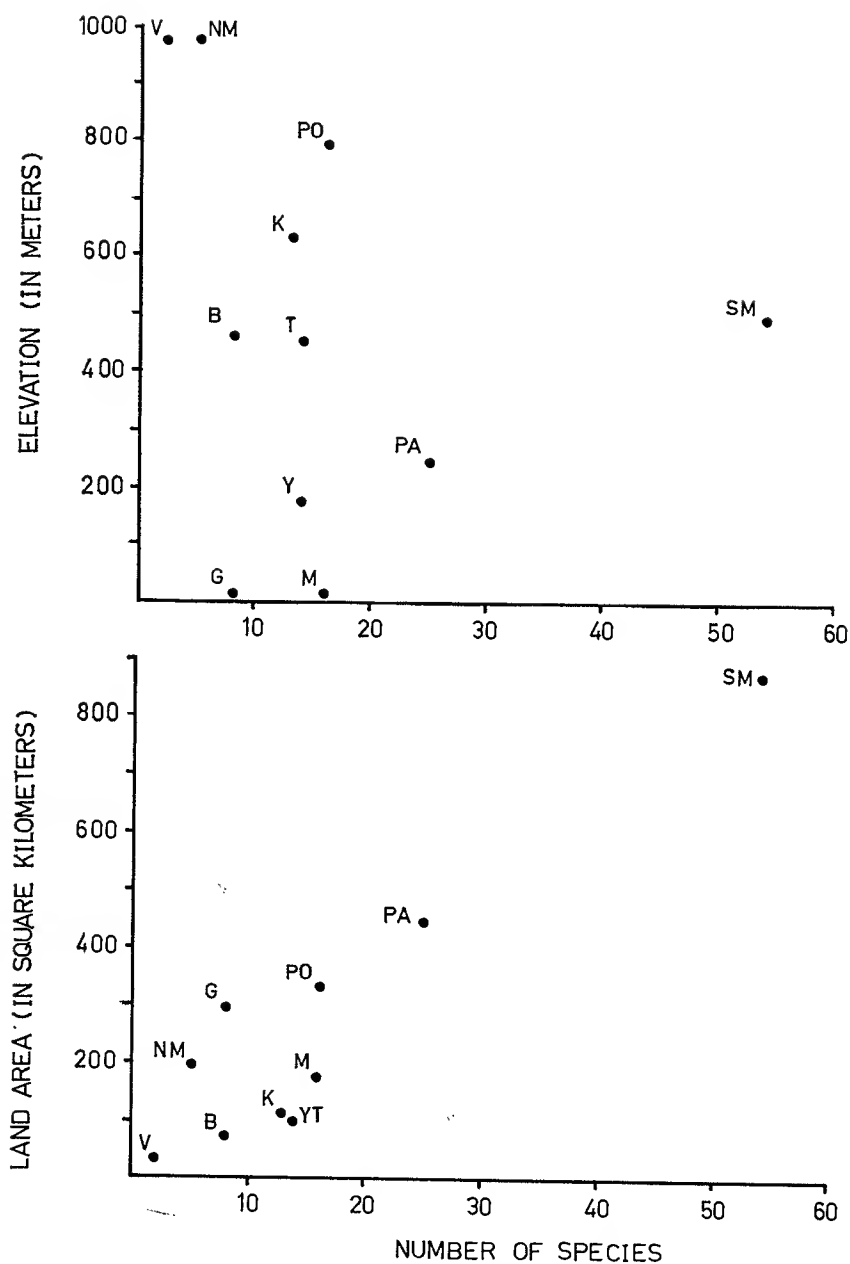


FIGURE 1.—Relationship between the Psocopteran fauna of Micronesian islands and their elevation and land area. B = Bonins, G = Gilberts, K = Kusiae, M = Marshalls, NM = Northern Marianas, PA = Palau, PO = Ponape, SM = Southern Marianas, T = Truk, V = Volcanos, Y = Yap.

The 25 species from Palau include 4 cosmopolitan, 2 found elsewhere only in the Pacific, 2 occurring in the Oriental region, and 2 in New Guinea. Ten species are widespread in Micronesia, and 8 are apparently endemic to Palau. There are 9 species in common with Yap, 8 with Ponape, and 8 with the S. Marianas.

Yap has 14 species represented in the collections, 9 of which also occur in Palau. Apparently only 1 species is endemic to Yap. There are no New Guinea species present, but 3 occur in the Oriental region, and 2 elsewhere only in the Pacific. Three species are cosmopolitan. Of the 14 species, 11 are widespread in Micronesia.

All but one of the 9 species from the atolls of the Carolines are widespread in Micronesia. The exceptional species has an interesting distribution, occurring on Tobi, Sonsorol, Ulithi, Sorol and Woleai atolls, but never having been collected from any of the high island groups, including Palau and Yap. This is evidently a true atoll form, which possibly cannot survive the competition existing on high islands.

Truk shows a fairly high degree of endemism, 5 of its 14 species being endemic. Of the remainder, 8 are widespread in Micronesia. Truk has most species in common with Ponape (6) and Kusaie (6). Two species are found in the Oriental region, and 2 elsewhere only in the Pacific.

Ponape, has 3 of its 16 species endemic; 13 are widespread in Micronesia, 8 of these also occurring in Palau. There are 8 species common to Ponape and Kusaie. There are 2 cosmopolitan species, 2 found elsewhere only in the Pacific, and 2 which occur in the Oriental region.

Of the 13 species from Kusaie, 12 are widespread in Micronesia and 1 is endemic. The greatest species overlaps are with the Marshalls (9), Ponape (8), and the S. Marianas (9). There are 3 purely Pacific species present on Kusaie, 3 which occur in the Oriental region, and 1 which is cosmopolitan.

All but one of the 16 species from the Marshall Islands are widespread in Micronesia, the remaining species also occurring in the Gilberts. There are 4 purely Pacific species, 3 cosmopolitan, and 3 which occur in the Oriental region and the Pacific. The greatest species overlaps are with the S. Marianas (12) and Kusaie (9).

Only 8 species have been collected from the Gilbert Islands, 6 of these being widespread in Micronesia, 1 occurring also in the Marshalls, and 1 occurring also on Ocean Island. These include cosmopolitan species (2), Oriental and Pacific species (2) and Pacific species (1). The greatest species overlap (5) is with the Marshalls.

A widespread Pacific species, *Ectopsocus fullawayi*, evidently occurs only on Wake Island in Micronesia.

Endemism is thus highest (Table 3) on Truk, Palau and the Southern Marianas. Yap and Kusaie, which have faunas of sizes similar to that of Truk, show relatively little endemism, whilst Ponape shows a moderate degree. There is moderate endemism in the Bonins, but apparently none in the N. Marianas, which are younger and have a poorer fauna than the S. Marianas, nor in the Marshalls or Gilberts, which are very low and very young.

Oriental species occur on all the island groups except the Bonins and N. Marianas, making up about 15% of the fauna of each group, but New Guinea species occur only on Palau (1), S. Marianas (3) and Bonins (1). The New Guinea fauna, however, is very poorly known.

The philotarsid genus *Haplophallus* is represented by two species, one endemic to the Bonins, and one to the S. Marianas; the genus has not invaded the Caroline chain. Other known species of the genus occur in S. China, the Seychelles, Africa and Tasmania. On the other hand, the two species of the related genus *Aaroniella*, which are closely related to *A. guttulata* (Banks) from the Philippines, occur only in the Carolines, one occurring on all the high island groups except Truk, the other on Truk alone. Thus within the family there seems to be species replacement in the Bonins, Marianas and Carolines; the family apparently has not successfully invaded the Marshalls or Gilberts. A similar situation is suggested by the distribution of the two species of *Hemipsocus*, one occurring only on Palau and Ponape, the other occurring elsewhere in the Carolines and in the S. Marianas and Marshalls, but being absent from Palau and Ponape. Species replacement in Micronesia is also evident within the *hirsutus* group of *Ectopsocus*: in the Bonins only *E. boharti* has been collected, in the Marianas only *E. thysanus*, and in the Carolines and Marshalls only *E. villosus* (see also Thornton and Wong, 1968).

The greatest amount of speciation appears to have been in the Pseudocaeciliidae, there being 15 species known only from Micronesia. Of the genus *Pseudoscottiella*, 8 species are apparently confined to the Carolines, with the greatest representation on Palau (5 species).

There has also probably been considerable speciation in the Lepidopsocidae, 3 species of *Echmepteryx*, 2 of *Lepidopsocus* and *Nepticulomima* being unknown outside Micronesia. Two of the species of *Lepidopsocus* have reached Hawaii, whereas a third, very widely distributed in Micronesia, has apparently not done so. A fourth species is confined, so far as is known, to the S. Marianas. Three of the 5 species of *Echmepteryx* are confined to the S. Marianas, the remaining 2 occurring also in Hawaii (1 is tropicopolitan). *Nepticulomima* is represented by 2 species, one confined to the S. Marianas, the other to Yap and Palau.

Of the 12 species of *Caecilius*, 9 are known only from Micronesia; 3 of

these are apparently endemic to the S. Marianas, 2 to Truk, 1 to Palau, 1 is found only on Palau and Yap, and 1 only on low west central Caroline islands and atolls.

The Ectopsocidae (along with the Pseudocaeciliidae) is the most richly represented family in Micronesia, with 18 species. However, only 4 of these are confined to the S. Marianas, 1 to the Bonins, 1 to Truk, 1 to Kusaie and 1 occurs on Truk, Ponape and Kusaie and in the Marshalls. Of the remainder, 4 are practically cosmopolitan, 3 are purely Pacific forms, 1 occurs in New Guinea and 2 in the Philippines.

The Myopsocidae of Micronesia have Australian (2) African (1) and Oriental (1) affinities.

The six species of the Psocidae are placed in the genus *Ptycta*, which has undergone explosive evolution on the Hawaiian archipelago and which has a species in South China, another in the Ryukyus, and representatives in Madagascar, New Guinea, Fiji, Samoa, South America and the Galapagos archipelago. Related forms occur in the Seychelles. Some of the Micronesian species appear to be related to one group of Hawaiian forms.

It is of interest to examine the species overlap within island groups in Micronesia. Table 4 shows the number of species in common between the island groups and this is converted into a % overlap in Table 5, to correct for the faunal size of each island group considered. In Table 6, this is further corrected, to take into account the faunal size of each member of the pair of groups under consideration, the percentage overlap of the total fauna of both groups (species in common being counted only once) being calculated. The high concordances between Palau and Yap, Ponape and Kusaie, Kusaie and the Marshalls, and the Marshalls and Gilberts, are not surprising. The high concordance between the S. Marianas and the Marshalls is chiefly due to species widespread in Micronesia occurring on both archipelagos and does not indicate any peculiar faunal affinity between the two groups of islands. It is interesting to note that Truk has more in common with Ponape and Kusaie than with Yap and Palau.

The Micronesian psocid fauna is rich in species but not in genera, suggesting that there has been more speciation than in continental islands, but less than that recently found to have occurred in Madagascar or Hawaii. Speciation has evidently been greatest in the Pseudocaeciliidae, Caeciliidae, Lepidopsocidae and Psocidae, although the Ectopsocidae is one of the most richly represented families. Endemism is highest in the S. Marianas, Palau and Truk.

The Psocidae show some affinities with the Hawaiian fauna and Micronesia may have been a route for the spread of *Ptycta* to Hawaii, where it has under-

Table 4. Number of psocid species in common for pairs of island groups in Micronesia

	Bonins		Volcanos		N. Mar- ianan		S. Mar- ianan		Palau	Yap	Truk	Ponape	Kusaie	Mar- shalls	Gilberts
Bonins	—	1	—	2	4	4	4	4	4	2	1	2	2	2	0
Volcanos	1	—	—	0	1	1	1	1	1	1	0	0	0	1	0
N. Marianas	2	0	0	—	5	5	5	5	2	3	0	3	3	3	1
S. Marianas	4	1	1	5	—	8	8	8	8	9	5	7	9	12	5
Palau	4	1	1	2	8	8	8	8	—	9	5	8	6	5	2
Yap	2	1	1	3	9	9	9	9	9	—	4	7	6	5	2
Truk	1	0	0	0	5	5	5	5	5	4	—	6	6	4	1
Ponape	2	0	0	3	7	7	7	7	8	7	6	—	8	6	3
Kusaie	2	0	0	3	9	9	9	9	6	6	6	8	—	9	3
Marshalls	2	1	1	3	12	12	12	12	5	5	4	6	9	—	5
Gilberts	0	0	0	1	5	5	5	5	2	2	1	3	3	5	—

Table 5. Percentage overlap of psocid fauna of island groups of Micronesia

	Bonins	Volcanos	N. Mar- ianas	S. Mar- ianas	Palau	Yap	Truk	Ponape	Kusaie	Mar- shalls	Gilberts
% Bonins fauna (8 spp.) on	—	13	25	50	50	25	13	25	25	25	0
% Volcanos fauna (2 spp.) on	50	—	0	50	50	50	0	0	0	50	0
% N. Marianas fauna (5 spp.) on	40	0	—	100	40	60	0	60	60	60	20
% S. Marianas fauna (54 spp.) on	7	2	9	—	15	17	9	13	17	22	9
% Palau fauna (25 spp.) on	16	4	8	32	—	36	20	32	24	20	8
% Yap fauna (14 spp.) on	14	7	21	64	64	—	29	50	43	36	14
% Truk fauna (14 spp.) on	7	0	0	36	36	29	—	43	43	29	7
% Ponape fauna (16 spp.) on	13	0	19	44	50	44	38	—	50	38	19
% Kusaie fauna (13 spp.) on	15	0	23	69	46	46	46	62	—	69	23
% Marshalls fauna (16 spp.) on	13	6	19	75	31	31	25	38	56	—	31
% Gilberts fauna (8 spp.) on	0	0	13	63	25	25	13	38	38	63	—

Table 6. Percentage of psocid fauna of pairs of island groups which is common to both groups

	Bonins		N. Mar- Volcanos ianas		S. Mar- ianas		Palau	Yap	Truk	Ponape	Kusaie	Mar- shalls	Gilberts
Bonins	—	11	18	7	1	10	5	9	11	9	0		
Volcanos	11	—	0	2	4	7	0	0	0	6	0		
N. Marianas	18	0	—	9	7	19	0	17	20	17	8		
S. Marianas	7	2	9	—	11	15	8	11	16	21	9		
Palau	14	4	7	11	—	30	15	24	19	14	6		
Yap	10	7	19	15	30	—	17	30	29	20	10		
Truk	5	0	0	8	15	17	—	25	29	15	5		
Ponape	9	0	17	11	24	30	25	—	38	23	14		
Kusaie	11	0	20	16	19	29	29	38	—	45	17		
Marshalls	9	6	17	21	14	20	15	23	45	—	26		
Gilberts	0	0	8	9	6	10	5	14	17	26	—		

gone considerable speciation to form a large endemic complex. There is no evidence at all that Micronesia has been a route for the spread of the other very large Hawaiian endemic complex, the family Elipsocidae not having been found in Micronesia.

SYSTEMATICS

The fauna is divided among 14 families as follows (including Banks' acceptable records):

Family	Genera	Species
Lepidopsocidae	5	13
Psoquillidae	1	1
Psyllipsocidae	1	1
Pachytroctidae	2	4
Caeciliidae	1	12
Philotarsidae	2	4
Lachesillidae	1	1
Ectopsocidae	2	18
Peripsocidae	1	3
Hemipsocidae	1	2
Pseudocaeciliidae	4	18
Archipsocidae	1	2
Myopsocidae	2	5
Psocidae	1	6
	<hr/> 25	<hr/> 90

KEY TO MICRONESIAN FAMILIES OF PSOCOPTERA

1. Antenna with more than 20 segments; tarsi of adults 3-segmented; pterostigma absent or not thickened; paraproct with strong posterior spine.....2
Antenna with 17 or fewer segments; tarsi of adults 2 or 3-segmented; pterostigma present, thickened or not; paraproct without posterior spine.....4
2. Head short, broad; inner face of second segment of maxillary palp with peg-like sensillum; fore wing without a nodulus; body and wings sometimes with scales.....3
Head long; inner face of second segment of maxillary palp without sensillum; fore wing with nodulus; scales absent.....PSYLLIPSOCIDAE
3. Body and wings with scales, claws with preapical tooth.....LEPIDOPSOCIDAE
Body and wings without scales, claws without preapical tooth.....PSOQUILLIDAE
4. Antenna with 15 or more segments; fore wing without nodulus...PACHYTROCTIDAE
Antenna with 13 segments; forewing with nodulus.....5
5. Labial palps broadly triangular, laterally diverging; female gonapophyses usually reduced, lacking a definite outer valve; lacinia narrowing apically, usually without diverging teeth.....CAECILIIDAE
Labial palps short, almost semi-circular, adpressed; female gonapophyses usually with well developed outer valve; lacinia not narrowing apically, usually toothed.....6

6. Forewing with discoidal cell closed (areola postica joined to media); if brachypterous, then glandular setae present on head.....7
Forewing with discoidal cell open (areola postica free or absent); brachypterous or apterous forms lack glandular setae.....9
7. Tarsi 3-segmented.....MYOPSOCIDAE
Tarsi 2-segmented.....8
8. Vein *m* of fore wing 2-branched.....HEMIPSOCIDAE
Vein *m* of fore wing 3-branched.....PSOCIDAE
9. Tarsi 3-segmented.....PHILOTARSIDAE
Tarsi 2-segmented.....10
10. Forewing without areola postica (if female brachypterous, wings are glabrous and genitalia complete).....11
Forewing with areola postica (if female brachypterous, wings are setose and only one pair of gonapophyses is present).....12
11. In hindwing, *rs* and *m* connected by a crossvein; claws without preapical tooth.....ECTOPSOCIDAE
In hindwing, *rs* and *m* fused for a length; claws with preapical tooth...PERIPSOCIDAE
12. Forewing with veins and margin glabrous.....LACHESILLIDAE
Forewing with veins and margin setose.....13
13. Forewing veins indistinct, membrane strongly setose; female genitalia reduced.....ARCHIPSOCIDAE
Forewing veins distinct, membrane not setose; female genitalia complete.....PSEUDOCAECILIIDAE

FAMILY LEPIDOPSOCIDAE Pearman, 1936

CHARACTERISTICS: Forewing lacking nodulus, pterostigma not thickened; wings, body and legs usually covered with scales; antennae with more than 20 segments, not ringed; tarsi 3-segmented; maxillary palp with peg-like sensillum on mesial surface of second segment.

The genera in this family are not well-defined. We have followed Roesler (1944) in placing the following species.

KEY TO MICRONESIAN GENERA OF LEPIDOPSOCIDAE

1. Forewing elytriiform, veins unrecognizable.....**Cyrtophania**
Veins of forewing distinct.....2
2. Antenna with fewer than 30 segments, segments about four times as long as thick; both fore and hindwing with distinct closed cell, that of hind wing narrow, basal.....3
Antenna with 30 or more segments, segments about twice as long as thick; distinct closed cell never present in both fore and hindwing.....4
3. Forewing rounded apically, vein *sc* not interrupted.....**Soa**
Forewing acuminate, vein *sc* interrupted.....**Nepticulomima**
4. In forewing veins *rs* and *r*₁ separate or linked by a crossvein.....**Echmepteryx**
In forewing veins *rs* and *r*₁ fused for a distance.....**Lepidopsocus**

Genus **Cyrtophania** Banks

Cyrtophania Banks, 1931, Proc. Hawaii Ent. Soc. 7 (3): 440.

Ptenocorium Enderlein, 1931, Trans. Linn. Soc. Lond. (Zool.) 19 (2): 223.

Pteroxaniella Karny, 1932, Insects of Samoa 7 (4): 122.

1. **Cyrtophania marginata** Thornton, Lee & Chui, n. sp. (fig. 2, a,g,i)

FEMALE: Coloration (after c. 7 years in alcohol). Head brown, darker on frons. Thorax pale brown. Legs pale brown, coxa and tibia somewhat darker than other segments except tibia apically pale. Forewing (fig. 2, a) brown, darker along anterior margin, in region of apex and along posterior margin apically; three prominent paler areas along posterior half of anterior margin, five pale areas adjacent to posterior margin, a number of paler streaks in middle of wing. Hindwings lacking, represented by minute scales. Abdomen pale brown.

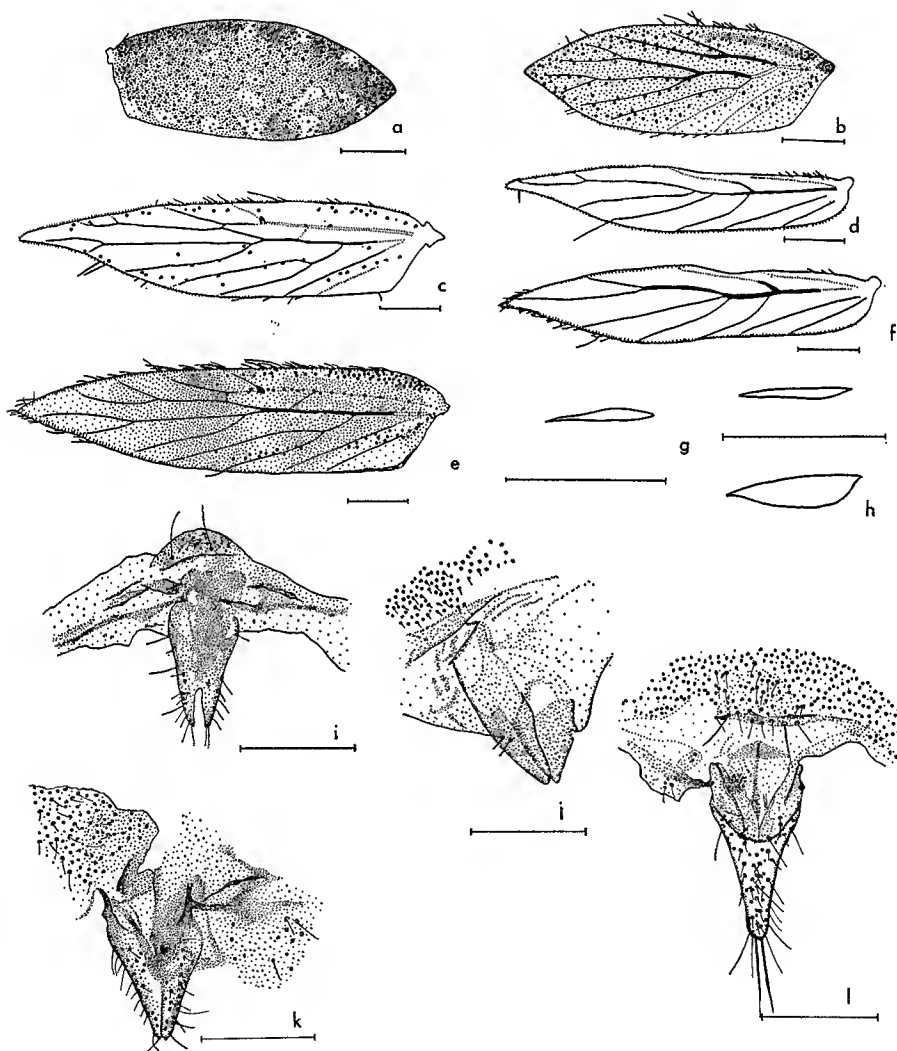


FIGURE 2.—Forewing: a, *Cyrtophania marginata*; b, *Echmepteryx dybasi*; c, *E. picticeps*; e, *E. carolinensis*; hindwing: d, *E. picticeps*; f, *E. carolinensis*; forewing scales: g, *C. marginata*; h, *E. carolinensis*; female genitalia: i, *C. marginata*; j, *E. picticeps*; k, *E. dybasi*; l, *E. carolinensis*. Scales a-f = 0.3 mm; g-h = 0.1 mm; i-l = 0.2 mm.

Morphology. I.O.: D. = 6.0: 1. Ocelli absent. Maxillary palp second segment from base with two subapical spines and basal sensillum. Venation of fore wing very indistinct, wing elytron-like, with hairs and symmetrical scales (fig. 2, g). No ctenidiobothria on hind tarsal segments. Pearman's organ consisting of rasp only. Gonapophyses and subgenital plate as in figure 2i. Paraprocts each with two trichobothria in rosette sockets and long slightly curved mesial spine. No abdominal scales found.

Body length (in alcohol): 1.5 mm (average of 10 specimens, range 1.0–2.0 mm).

MALE: Unknown.

Holotype, ♀ (FM), Marshall Is., Eniwetok I., in crown of uprooted coconut, Nov. 11, 1944, Edgar. Paratypes, Saipan: June 29, 1951, R.M. Bohart; Jan. 27, 1945, Dybas; As Mahetog area, sifting decaying banana leaves and stems, Apr. 22, 1945, Dybas. Tinian: ridge, SE section, Mar. 20, 1945, Dybas; Mar. 16–30, 1945, Dybas. Guam: Umatac, under stone, Mar. 1958, Krauss. Additional specimens, Jaluit Atoll: Mejetto I., fungus, Apr. 25, 1958; Mejetto I., breadfruit bark, Apr. 25, 1958; Jabor I., *Pandanus*, berlese, Apr. 24, 1958; Jibu I., *Pandanus*, Apr. 29, 1958; Lejrok I., *Anous* bird nest, Apr. 25, 1958; all by Gressitt. Eniwetok Atoll: Eniwetok I., Nov. 8, 1944, Dybas.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian, Guam), Marshall Is. (Jaluit, Eniwetok), Fiji, Samoa, Mangareva, Fanning.

Differs from the Hawaiian species in details of forewing pattern, and head markings. We have examined specimens in the Bishop Museum collection from Fiji, Samoa, the Mangareva Islands and Fanning Island.

Genus *Echmepteryx* Aaron

Echmepteryx Aaron, 1886, Proc. Acad. Nat. Sci. Philad. 38: 17.

KEY TO MICRONESIAN SPECIES OF ECHMEPTERYX

1. Along whole length of forewing an obvious median, wide dark brown longitudinal band, discernible with scales intact and on membrane with scales removed **3. madagascariensis**
Forewing not marked as above.....2
2. Forewing short, broad, bluntly pointed; hindwing reduced.....**5. dybasi**
Forewing lanceolate; hindwing normal.....3
3. Membrane of forewing of uniform pale color or hyaline.....4
Membrane of forewing with vague fuscous markings.....**6. carolinensis**
4. Across front of head a narrow, curved brown band below ocelli and second similar band between antennal sockets.....**2. lunulata**
Head with complex pattern of dark brown.....**4. picticeps**
- 2. *Echmepteryx* (*Thylacopsis*) *lunulata* Thornton, Lee & Chui, n. sp.**
(fig. 3, n-p)

FEMALE: Coloration (freshly killed, in alcohol). Head and body pale yellowish cream. Very pale reddish brown mark each side of median epicranial suture, lunulate transverse mark across frons anterior to ocelli, lacking an adjacent median circle posterior to it; a reddish

brown band from orbit to antennal socket, continuing to fronto-sclypeal suture and extending along it mesially, but not extending along scape. Clypeus with a similar colored band along anterior border, labrum with a mark on each side. Eyes black; ocelli pale, bordered dark reddish brown along inner margins. Maxillary palps and antennae pale yellowish cream. Thorax yellowish cream, except each side a dark brown pleural stripe above coxae. Legs pale, two pale brown bands on tibia, basal segment of tarsus darker basally. Wing membrane hyaline (fig. 3, n). Abdomen cream.

Morphology. I.O.:D. = 4.0:1. Thoracic terga slightly waxy. Basal hind tarsal segment with 18 ctenidiobothria, claws with two preapical teeth and a suggestion of a third, Pearman's organ present. Venation of wings as figured (fig. 3, n, o). Abdominal scales symmetrical. Epiproct and paraprocts simple, latter with six trichobothria. Subgenital plate simple, setose; gonapophyses (fig. 3, p) as usual for the genus.

Body length (in alcohol): 1.4–2.0 mm (10 specimens: average 1.73 mm).

MALE: Unknown.

NYMPHS: Recognizable on head pattern.

Holotype, ♀ (BISHOP 9522), Hawaii: Hawaii I., Hilo Macadamia orchard, *Araucaria*, Nov. 6, 1961, Thornton. Paratypes, same data. Additional specimens, Chichi Jima: Jul. 10, 1951, R.M. Bohart. Pagan: Songsong, Apr. 27, 1940, Yasumatsu & Yoshimura. Saipan: marsh N. of Garapan, Mar. 3, 1945; SW, May 7, 1945; Halaihai-As Teo area, Feb. 7, 1945; Achugau area beating, Dec. 16, 1944; Papago area, beating, Jan. 27, 1945; Sadog Talofoto, *Pandanus*, Mar. 2, 1945; Sadog Talofoto, in fungus, Feb. 9, 1945; Achugau area, under bark, Dec. 31, 1944; Halaihai-As Teo area, *Pandanus*, Feb. 4, 1945; near Garapan, beating, Jan. 19, 1945; As Mahetog area, dead Papaya stump, May 19, 1945; 1 mile NNE of summit Mt. Tagpochau, beating, Jan. 18, 1945; Pidos Kalahe (Mt. Magpi) summit, Mar. 1, 1945; Apr. 17, 1945; Papago area, beating, Jan. 18, 1945; Sadog Talofoto, beating, Feb. 9, 1945; As Mahetog area, beating, Jan. 19, 1945; Mt. Tagpochau, 380 m, Feb. 18, 1945; As Mahetog area, sifting decaying banana stems and leaves, Apr. 22, 1945; all by Dybas. Tinian: Mar. 16–30, 1945; Lake Hagoi, beating, Apr. 4, 1945; beach coves off Gurgan Pt., sifting leaf-litter, Apr. 5, 1945; NW slope Mt. Lasso, beating, and under bark of large stump, Mar. 18, 1945; Apr. 14, 1945; ridge, SE section, beating, Mar. 27, 1945; ridge 1 mile N. of Tinian harbor, Mar. 18, 1945; N. of Gurgan Point, Apr. 14, 1945; ridge, SE section, Mar. 27, 1945; all by Dybas. Guam: Amantes Point, beating, May 27, 1945; Dybas. Palau: Babelthuap: Ngaremeskang, 25 m, Dec. 20, 1952, Gressitt. Yap: Jul. 11, 1950, Gressitt; Yap I., Jul–Aug. 1950, Goss. Kusaie: Malen R., 90 m, beating, Mar. 17, 1953, Clarke; Lelu (Lele) 1 m, Mar. 12, 14, 1953, Clarke. Arno Atoll: Ine I., Jun. 17, 1950, Usinger.

DISTRIBUTION: Hawaii, Bonin Is. (Chichi Jima), N. Mariana Is. (Pagan), S. Mariana Is. (Saipan, Tinian, Guam), Caroline Is. (Palau, Yap, Kusaie), Marshall Is. (Arno).

This species differs from *E. (Thylacopsis) madagascariensis* in lacking the dark longitudinal fascia on the forewing membrane, in head pattern (distinguishable in the nymph), as well as in the possession of a distinct crossvein between r_1 and rs in the forewing, and a dark thoracic pleural stripe.

It differs from *Thylacopsis falco* Bad. in details of head markings (e.g. no median clypeal mark), from *E. similis* Bad. in that the wing membrane is hyaline and in details of the head markings, and from *E. pallida* Smithers, which it most closely resembles, in fine details of the head markings. It is clearly very closely related to the latter Australian species.

3. *Echmepteryx (Thylacopsis) madagascariensis* (Kolbe) NEW COMBINATION.

Thylax madagascariensis Kolbe, 1885, Berl. Ent. Z. **29**: 184. —Enderlein, 1908, Reise in Ostafrika in den Jahre 1903–1905 von Prof. Dr. Alfred Voeltzkow, I–II, Stuttgart: 255.

Thylacopsis madagascariensis: Enderlein, 1911, Palaeontographica **58**: 348; 1931, Trans. Linn. Soc. Lond. (Zool.) **19** (2): 229.

Echmepteryx costalis Banks, 1931, Proc. Hawaii. Ent. Soc. **7** (3): 439. —Williams, 1931, Proc. Hawaii Ent. Soc. **7** (3): 371.

Lepidopsocus costalis: Zimmerman, 1948, Insects of Hawaii **2**: 224.

Thylacopsis albidus Badonnel, 1949, Rev. Franc. Ent. **16**: 25.

Echmepteryx albidus: Badonnel, 1962, Biologie de l'Amerique Australe. **1**: 186.

DISTRIBUTION: West Africa, Madagascar, Seychelles, Hong Kong, Kermadecs, Hawaii, Chile, possibly also eastern Central America, northeast S. America, West Indies (see Thornton, 1966), Bonin Is. (Chichi Jima), N. Mariana Is. (Anatahan), S. Mariana Is. (Saipan).

BONIN IS. CHICHI JIMA: Jul. 1951, R.M. Bohart.

N. MARIANA IS. ANATAHAN: Aug. 1951, R.M. Bohart.

S. MARIANA IS. SAIPAN: Tuturam, Laulau Bay, beating, Jan. 1945; SW, May, 1945; As Mahetog area, sifted from *Pandanus* fruit, Mar. 1945; Sadog Talofof, *Pandanus*, Mar. 1945; As Mahetog area, decaying crown of *Pandanus*, Mar. 1945; Papago area, beating, Jan., 1945, all by Dybas.

4. *Echmepteryx (Thylacopsis) picticeps* Thornton, Lee & Chui, n. sp. (fig. 2, c, d, j; 4, c, e)

FEMALE: Coloration (after c. 20 years alcohol storage). Head generally buff, patterned with dark brown; a dark brown band from orbit to antennal socket, and a dark brown spot mesial to orbit on posterior surface of vertex. Eyes black; ocelli pale, with dark brown margins. Maxillary palp and ocelli pale buff. Thorax buff, except a granulated dark brown longitudinal mark extending over cervicum and pro- and meso-thoracic pleura. Legs buff, except a brown band near basal end of hind tibia. Wing membranes pale buff. Abdomen cream, a pair of dark brown spots apically.

Morphology. I.O.: D. = 6.1: 1. Occipital and frontal sutures ill-defined. Vertex, frons, and clypeus laterally with close-set long narrow curving scales. Maxillary palp with basal sensillum on second segment, apical segment (fig. 4, c) very broad and short. Venation of wings

as in fig. 2, c, d. Number of ctenidiobothria on hind tarsal segments: 13; 0; 0. Pearman's organ consisting of rasp only. Gonapophyses (fig. 2, j) short and broad. Paraprocts each with a group of 5 trichobothria with rosette sockets and 1 without; long curved posterior spine. Abdominal scales (fig. 4, e) symmetrical.

Body length (in alcohol): 1.6 mm (average of 8 specimens, range 1.1–1.9 mm).

MALE: Unknown.

Holotype, ♀ (FM), Mariana Is., Saipan, Halaihai-As Teo area, beating, Feb. 7, 1945, Dybas. Paratypes: Saipan: Talofoto ridge, beating, Jan. 23, 1945; hills E. of Garapan, beating, Jan. 23, 1945; As Mahetog area, beating, Jan. 20, 1945. Tinian: NW slope Mt. Lasso, beating, Mar. 17, 1945; all by Dybas.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian).

5. *Echmepteryx dybasi* Thornton, Lee & Chui, n. sp. (fig. 2, b,k; 4, d,g)

FEMALE: Coloration (after c. 20 years alcohol storage). Head buff, patterned with brown (fig. 4, g); a brown band from orbit to brown pigment surrounding antennal socket, an oblique brown band parallel to this, also reaching antennal socket pigment, on gena. Eyes black, ocelli absent. Maxillary palps and antennae pale buff. Thoracic terga and pleura creamy-buff, dark brown granulated longitudinal band from orbit posteriorly over cervicum and upper part of pleura. Legs uniform creamy-buff. Forewing membrane (scales lost) light brown, a slightly paler area distal to apex of *an* (fig. 2, b). Abdomen pale cream, transverse grey-brown banding evident laterally.

Morphology. I.O.: D. = 6.0:1. Ocelli lacking. Occipital and frontal sutures well-defined. Vertex, frons and sides of clypeus with long, curving, narrow scales. Maxillary palp (fig. 4, d) second segment with stout subapical setae and basal sensillum. Forewing venation as in fig. 2, b, with long fine hairs and narrow scales. Hindwing reduced. Pearman's organ consisting of rasp only. Number of ctenidiobothria on hind tarsal segments: 13; 1; 0. Genitalia as in fig. 2, k. Paraprocts each with a row of 4 trichobothria and a long posterior spine.

Body length (in alcohol): 1.3 mm (average of 7 specimens, range 0.8–1.8 mm).

MALE: Unknown.

Holotype, ♀ (FM), Mariana Saipan, Is., Sadog Talofoto, Feb. 12, 1945, Dybas. Paratype, Saipan: Tuturam, Laulau Bay, beating, Jan. 22, 1945, Dybas.

DISTRIBUTION: S. Mariana Is. (Saipan).

This species will not run to any of the genera keyed by Roesler (1944). It resembles *Echmepteryx terricolis* Bad. in venation (*rs* 2-branched, fused to *m* which is 3-branched) and in the reduction of the hindwing and lack of ocelli. The resemblance in head pattern to an undescribed species of *Lepolepis* from Hawaii, and to *Pteroxanium kelloggi* (Ribaga) is quite marked, but the wing scales are quite different from those of the Hawaiian *Lepolepis*. The generic criteria in the Lepidopsocinae are at present unsatisfactory, and until a revision is made it seems prudent to place this species in *Echmepteryx* Aaron *s.l.* (see discussion by Badonnel, 1963, *Biologie de l'Amerique Australe* 2: 298).

6. *Echmepteryx* (*Thylacopsis*) *carolinensis* Thornton, Lee & Chui, n. sp. (fig. 2, e,f,h,l)

FEMALE: Coloration (after c. 16 years alcohol storage). Color of body not discernible,

except legs: femur darker apically, tibia with two broad brown bands, tarsus darker basally. Forewing membrane with fuscous markings, hindwing membrane pale brown, veins brown.

Morphology. I.O.: D. = 5.5: 1, ocelli wide-set, lateral ocelli about midway between orbital margin and sagittal suture. Venation of wings as in fig. 2, e, f. Membrane liberally clothed with hairs and asymmetrical scales (fig. 2, h). Number of ctenidiobothria on hind tarsal segments: 15; 0; 0. Pearman's organ consisting of rasp only. Subgenital plate distinct, small, setose (fig. 2, l). Gonapophyses (fig. 2, l) elongate. Paraprocts each with 6 trichobothria set in rosette sockets and long mesial spine. Abdominal scales lost.

Body length (in alcohol): 1.6 mm (average of 5 specimens, range 1.2–2.0 mm).

MALE: Unknown.

Holotype, ♀ (US 71406), Caroline Is., Yap, Yap I., Dugor-Rumu, 10 m, Nov. 29, 1952, Gressitt. Paratypes, Palau: Koror: sweeping, Mar. 10, 1954, Beardsley. Yap: Yap I., Mt. Gillifitz, 150 m, Nov. 29, 1952, Gressitt; Yap I., Mt. Matade, 60 m, Dec. 2, 1952, Gressitt; Yap I., hill behind Yaptown, 50 m, light trap, Dec. 3, 1952, Gressitt. Truk: Tol I., Olej, Apr. 8, 1940, Yasumatsu and Yoshimura. Ponape: Ag. Exp. Stn., Jun.–Sep. 1950, Adams.

DISTRIBUTION: Caroline Is. (Palau, Yap, Truk, Ponape).

Genus *Lepidopsocus* Enderlein

Lepidopsocus Enderlein, 1903, Ann. Hist. Nat. Mus. Hung., 1: 328.

KEY TO MICRONESIAN SPECIES OF *LEPIDOPSOCUS*

1. Forewing membrane hyaline; head cream, unmarked.....**10. pallidus**
- Forewing membrane with fuscous patch; head with brown markings or patches.....2
2. Central area of forewing membrane hyaline; clypeus with marginal brown band, a median dark band distally, and a pair of circular brown patches.....**9. pretiosus**
- Central area of forewing membrane fuscous; clypeus with marginal brown band only.....3
3. Vertex with a pair of wedge-shaped brown patches; forewing membrane with broad transverse band midway along its length, and separate small fuscous patch near wing apex**8. marmoratus**
- Vertex with a pair of rounded brown patches; most of forewing membrane fuscous, no separate distal fuscous patch.....**7. maculatus**
- 7. *Lepidopsocus maculatus* Thornton, Lee & Chui, n. sp. (fig. 3, j–m)**

FEMALE: Coloration (freshly killed, in alcohol). Head generally pale cream with distinct grey-brown markings. Eyes black; ocelli pale with dark inner borders and often with associated grey-brown pigment. Genae pale cream. Maxillary palps pale cream, antennae brown. Thorax ventrally pale cream, dorsally light brown, pleura grey-brown. Legs pale cream, distinct grey-brown bands near apex of femur, a short distance from base of femur, some distance from apex of tibia, at base of basal tarsal segment; coxa of hind leg brown. Forewing (fig. 3, j) extensively fuscous, except in apical region, small areas round margins and near base; *rs* + *m* and its branches darker than other veins. Hindwing (fig. 3, k) hyaline, almost all veins dark. Abdomen pale cream, indistinct grey-brown bands dorsally.

Morphology. I.O.: D. = 5.8: 1. Thoracic terga waxy. Basal hind tarsal segment with 16 ctenidiobothria, claws with small preapical tooth, Pearman's organ present. Fore and hindwings pointed, venation as in figure 3, j, k. Forewing scales of three types. Scales on

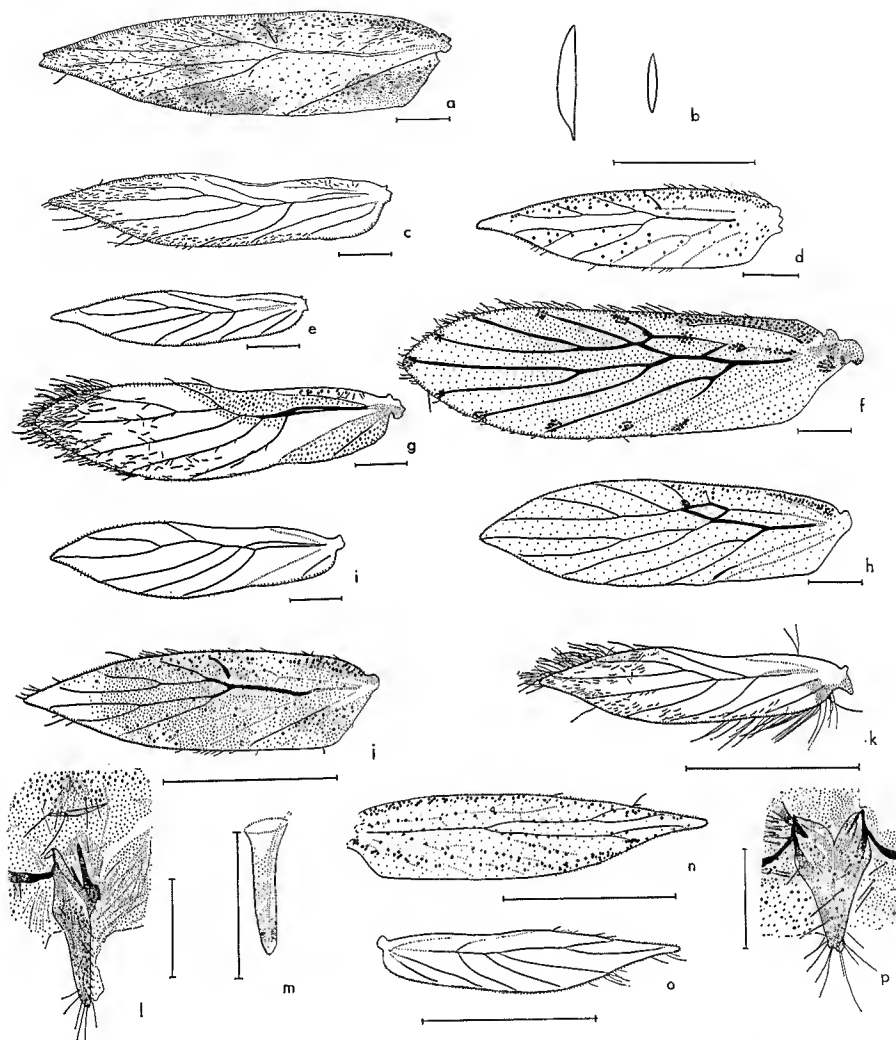


FIGURE 3.—*Lepidopsocus pretiosus*: **a**, forewing; **b**, forewing scales; **c**, hindwing; *L. pallidus*: **d**, forewing; **e**, hindwing; *Nepticulomima bothriata*: **f**, forewing; **g**, hindwing; *N. lineatus*: **h**, forewing; **i**, hindwing; *L. maculatus*: **j**, forewing; **k**, hindwing; **l**, gonapophyses; **m**, spermapore sac; *Echmepteryx lunulata*: **n**, forewing; **o**, hindwing; **p**, gonapophyses. Scales a, c-h = 0.3 mm; b, i = 0.1 mm; l, p = 0.2 mm; j-k, n-o = 1.0 mm.

underside of abdomen of two types, symmetrical. Epiproct simple, rounded posteriorly, sparsely setose; paraprocts simple, with six trichobothria in rosette sockets. Subgenital plate simple, setose. Gonapophyses (fig. 3, l), narrow median pouch for spermapore (fig. 3, m).

Body length (in alcohol): 1.6–2.0 mm (10 specimens, average 1.8 mm).

MALE: Unknown.

NYMPHS: Recognizable on head pattern.

Holotype, ♀ (BISHOP 9523), Hawaii: Kauai I., 200 m, Napali Cliffs, *Metrosideros*, Apr. 12, 1963, Thornton. Paratypes, same data. Additional specimens, Saipan: Apr. 17, 1945, Dybas.

DISTRIBUTION: Hawaii, S. Mariana Is. (Saipan).

L. maculatus closely resembles *Lepidopsocus pretiosus* Banks, the type of which we have examined, and which was described from Guam. It differs, however, in head markings, *L. pretiosus* having a dark median fascia on the clypeus anteriorly, and simpler vertex pattern. *L. maculatus* differs from the less common Hawaiian species *L. marmoratus* in that it lacks the distinct dark patch in the middle of the forewing (fig. 3, j), the origins of m_{1+2} and m_3 in the hind wing are much closer together, and in the head markings.

8. *Lepidopsocus marmoratus* (Banks)

Echmepteryx marmorata Banks, 1931, Proc. Hawaii. Ent. Soc. 7 (3): 439. —Williams, 1931, Proc. Hawaii Ent. Soc. 7 (3): 371. —Krauss, 1945, Proc. Hawaii. Ent. Soc. 12 (2): 310. *Lepidopsocus marmorata*: Zimmerman, 1948, Insects of Hawaii 2: 225.

DISTRIBUTION: Hawaii, S. Mariana Is. (Saipan, Tinian).

S. MARIANA IS. SAIPAN: Kalabera area, Jan. 1945; Tutturam, Laulau Bay, Jan. 1945; Pidos Kalahe (Mt. Magpi) summit, Apr. 1945; Kalabera area, Feb. 1945; Halaihai-As Teo area, Feb. 1945. TINIAN: Marpo valley, Apr. 1945; NE slope Mt. Lasso, Apr. 1945; all by Dybas.

9. *Lepidopsocus pretiosus* (Banks) NEW COMBINATION (fig. 3, a-c; 4, h)

Echmepteryx pretiosa Banks, 1942, Bull. Bishop Mus. 172: 28.

DISTRIBUTION: N. Mariana Is. (Pagan), S. Mariana Is. (Saipan, Tinian, Guam), Caroline Is. (Yap, Ponape, Pingelap, Kusaie), Marshall Is. (Jaluit, Arno).

N. MARIANA IS. PAGAN: Regusa-Tarangue, Apr. 1940, Yasumatsu and Yoshimura.

S. MARIANA IS. SAIPAN: Apr. 1951; Kalabera area, Jan. 1945; As Mahetog area, Jan. 1945; Halaihai-As Teo area, beating, Jan. 1945; Tutturam, Laulau Bay, beating, Jan. 1945; Achugau area, beating, Dec. 1944; Chalan Laulau area, beating, Jan. 1945; Pidos Kalahe (Mt. Magpi) summit, Apr. 1945; near Garapan, beating, Jan. 1945; As Mahetog area, in dead Papaya stump, May 1945; Talofoto ridge, beating, Jan. 1945; hills E. of Garapan, beating, Jan. 1945; Chalan Laulau area, under boards, Jan. 1945; Papago area, beating, Jan. 1945; Laulau Bay, beating mango, Dec. 1944; Sadog Talofoto, beating, Feb. 1945; Mt. Tagpochau, 400 m, Feb. 1945; As Mahetog area, beating, Jan. 1945; all by Dybas. TINIAN: Mar. 1945; Tinian Harbor, Mar. 1945; NW slope Mt. Lasso, Mar. 1945; Marpo Valley, Apr. 1945; Lake Hagoi, beating, Apr. 1945; NE slope Mt. Lasso, Apr. 1945; ridge, SE section, beating, Mar. 1945; Tinian Harbor, on dead *Poinciana*,

Mar. 1945; N. of Gurgan Point, Apr. 1945; all by Dybas. GUAM: Fadang, in dry fibrous core of *Pandanus* fruit, Apr. 1945, Dybas; Mt. Alifan, Apr. 1946, Krauss; Pt. Oca, May 1945, Gressitt (Plesiotype); Yigo, Feb. 1950, Krauss.

YAP. Map I., coconut palm, Aug. 1950, Goss.

PONAPE. Ag. Exp. Stn., Jun.–Sep. 1950, Adams.

CAROLINE ATOLLS. PINGELAP: Jan. 1953, Gressitt.

KUSAIE. Malem R., 90 m, beating, Mar. 1953, Clarke.

MARSHALL IS. JALUIT: Jabor I., May 1958, Gressitt; Pinlep I., Apr. 1958, Gressitt. ARNO: Ine I., Apr. 1950, Usinger.

One of us (I.W.B.T.) has examined paratype No. 23830 in the Museum of Comparative Zoology at Harvard, and we give a drawing of the head pattern (fig. 4, h). The forewing venation drawn by Banks does not agree with that of any of the specimens we have examined, and we thus provide drawings of venation and membrane pattern of a specimen from the type locality (Guam) (fig. 3, a–c). There is a closed narrow cell near the base of vein *r* in the hind wing, as drawn by Banks.

The species is widespread in Micronesia and is clearly related to *L. maculatus* and *L. marmoratus*, both of which have reached Hawaii.

10. *Lepidopsocus pallidus* Thornton, Lee and Chui, n. sp. (fig. 3, d, e; 4, f)

FEMALE: Coloration (after c. 20 years alcohol storage). Head, abdomen dorsally, cream. Thorax, including legs, and ventral surface of abdomen pale brown. Eyes black, ocelli pale.

Morphology. I.O.: D. = 6.5: 1. Venation of wings as in fig. 3, d, e. Number of ctenidiobothria on hind tarsal segments: 12; 1; 0. Pearman's organ consisting of rasp only. Gonapophyses long, with long setae. Paraprocts each with a field of 8 trichobothria in rosette sockets and one without, posterior spine fairly short, curved. Abdominal scales (fig. 4, f) lanceolate, symmetrical, of two types.

Body length (in alcohol): 1.5 mm.

MALE: Unknown.

Holotype, ♀ (FM), Mariana Is., Saipan, As Mahetog area, beating, Jan. 20, 1945, Dybas.

DISTRIBUTION: S. Mariana Is. (Saipan).

Genus **Nepticulomima** Enderlein

Nepticulomima Enderlein, 1906, *Spolia Zeylan.* 4: 95.

KEY TO MICRONESIAN SPECIES OF NEPTICULOMIMA

Forewing membrane with prominent groups of sockets at ends of veins and along vein *r*, sockets also distributed over costal area basally.....**11. bothriata**
Forewing with sockets restricted to costal area basally.....**12. lineatus**

11. *Nepticulomima bothriata* Thornton, Lee and Chui, n. sp. (fig. 3, f, g; 4a)

FEMALE: Coloration (after c. 13 years dry storage). No distinguishable head pattern

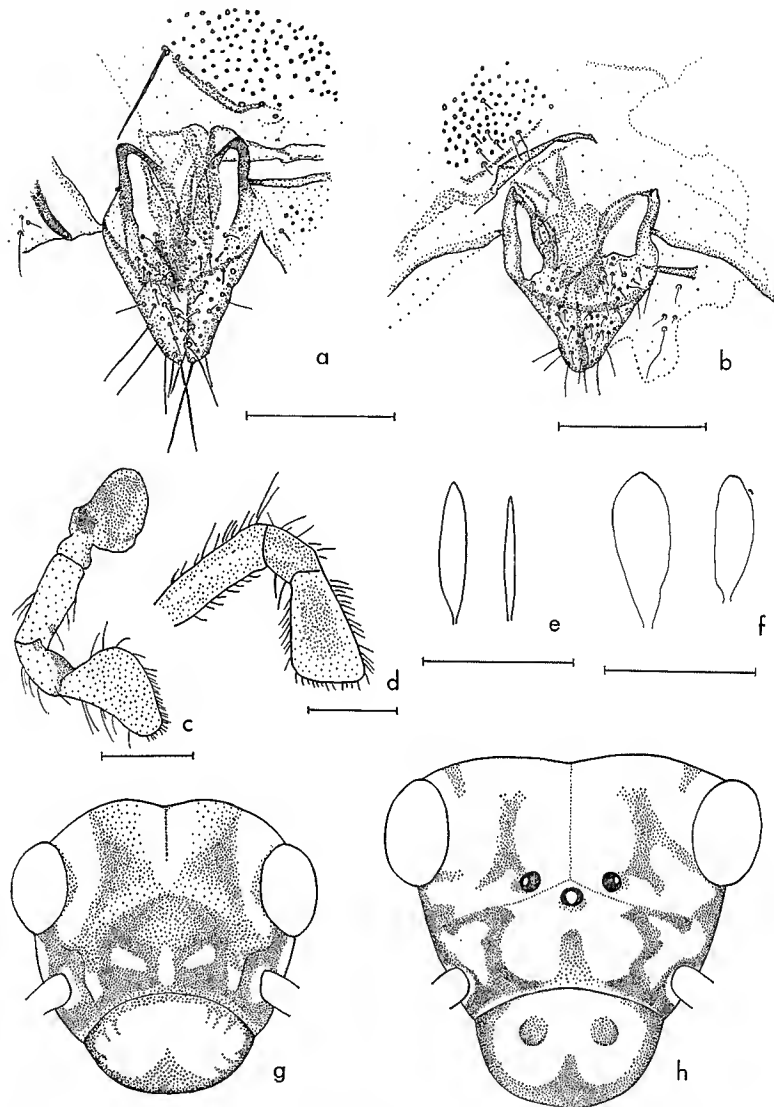


FIGURE 4.—Female gonapophyses: **a**, *Nepticulomima bothriata*; **b**, *N. lineatus*; maxillary palp: **c**, *Echmepteryx picticeps*; **d**, *E. dybasi*; abdominal scales: **e**, *E. picticeps*; **f**, *Lepidopsocus pallidus*; head pattern: **g**, *E. dybasi*; **h**, *L. pretiosus*. Scales a–b = 0.2 mm; c–d = 0.1 mm; e–f = 0.05 mm.

after softening and scale removal, surface of head uniformly fairly dark brown, saggital suture very dark. Thorax pale brown. Legs brown, tibia darker than femur, except apically, tarsus pale apically. Wings hyaline, veins brown. Abdominal color not discernible.

Morphology. I.O.: D. = 4.5: 1, ocelli wide apart, lateral ocelli nearer to orbit margin than saggital suture. Venation as in fig. 3, f, g. Forewing with patches of large sockets at ends

of veins and along vein *r*, these sockets otherwise restricted to costal area. Hindwing in anal and costal area with minute rod-like microtrichiae, giving the membrane a slightly greyish appearance. Basal hind tarsal segment with 20 ctenidiobothria, apical segments without any. Pearman's organ consists of rasp only. Subgenital plate small, simple. Gonapophyses (fig. 4, a) short, squat, setose. Paraprocts each with six trichobothria with rosette sockets and one without, a long straight spine. Abdominal scales lost.

Body length (in alcohol): 2.1 mm (average of 5 specimens, range 1.7–2.3 mm).

MALE: Unknown.

Holotype, ♀ (US 71407), Caroline Is., Palau, Ngarameskang, 30 m, Dec. 21, 1952, Gressitt. Paratypes, Palau; Koror: at light, Aug. 1952, Beardsley; NE, 40 m, limestone ridge, Dec. 14, 1952, Gressitt; Babelthuap: E. Ngatpang, 65 m, Dec. 9, 10, 1952, Gressitt. Yap: Yap I., Oct. 1951, Krauss.

DISTRIBUTION: Caroline Is. (Palau, Yap).

This large species lacks the anteriorly directed crossvein on vein *r* in the forewing, which is found in *N. lineatus* (below) but agrees in venation otherwise, and in having sockets for macrotrichiae (?) distributed over the costal area basally. It differs in having groups of sockets at the ends of the veins and along vein *r*.

12. *Nepticulomima lineatus* Thornton, Lee & Chui, n. sp. (fig. 3, *h, i*; 4, *b*)

FEMALE: Coloration (after c. 20 years alcohol storage). Head generally buff, a pair of faint brown crescentic patches on frons, antennal socket broadly ringed with dark brown, this pigment extending over gena and along lateral margin of clypeus; very narrow brown line from orbit to antennal socket pigment, distinct discreet dark brown patch in middle of gena posterior to antennal socket. Eyes black; ocelli heavily pigmented marginally with dark brown. Antenna buff, two basal segments with grey-brown line on under side; maxillary palp buff, a dark brown line along mesial surface. Thoracic terga creamy buff, a pair of transverse grey-brown marks on prothorax and metathorax. Pleura cream, a wide grey-brown longitudinal band over pro- and mesothoracic pleura. Legs with coxa dark grey-brown otherwise buff apart from grey-brown marks near basal and distal ends of femur and tibia. Forewing membrane with large brown central area, otherwise hyaline. Hindwing membrane hyaline. Abdomen buff.

Morphology. I.O.: D. = 3.0: 1. Occipital, but not frontal suture, distinct. Venation of wings as in fig. 3, *h, i*. Number of ctenidiobothria on hind tarsal segments: 16; 1; 0, basal segment tapering distally. Pearman's organ consisting of rasp only. Gonapophyses (fig. 4, *b*) short, broad. Paraprocts each with a group of 6 trichobothria in rosette sockets and 1 without.

Body length (in alcohol): 1.5 mm (average of 5 specimens, range 1.2–1.7 mm).

MALE: Unknown.

NYMPH: Coloration as female.

Holotype, ♀ (FM), Mariana Is., Tinian, beach cove S. of Gurgan Point, Mar. 16, 1945, Dybas. Paratypes: Tinian, beach cove S. of Gurgan Point, sifting leaf mould, Mar. 27, 1945, Dybas.

DISTRIBUTION: S. Mariana Is. (Tinian).

Of the two species of this genus found in Micronesia, one is found in the S. Marianas, the other in the W. Carolines, and there is apparently no range overlap.

Genus **Soa** Enderlein

Soa Enderlein, 1904, Zool. Jb., Abt. Syst. **20** (2): 109.

13. *Soa dahlia* Enderlein

Soa dahlia Enderlein, 1904, Zool. Jb., Abt. Syst. **20** (2): 109; 1906a, Spolia Zeylan. **4**: 79, 80. —Banks, 1942, Bull. Bishop Mus. **172**: 28.

DISTRIBUTION: Bismarck Archipelago, Guam.

This species was recorded by Banks from Guam, and is not present in the collections before us. It was originally described from the Bismarck Archipelago.

FAMILY PSOQUILLIDAE Pearman, 1936

CHARACTERISTICS: Ocelli lacking; wings reduced at least to some extent, but with veins, antenna of more than 20 segments, not with scales.

Genus **Rhyopsocus** Hagen

Rhyopsocus Hagen, 1876, Bull. U.S. Nat. Mus **1** (3): 52. —Roesler, 1944, Stettin. Ent. Ztg. **105**: 130. —Badonnel, 1949, Bull. Inst. Sci. Nat. Belg. **25** (11): 29. —Mockford and Gurney, 1956, J. Wash. Acad. Sci. **46**: 357.

Deipnopsocus Enderlein, 1903, Zool. Jb., Abt. Syst. **18**: 358.

Rhyopsocopsis Pearman, 1929, Ent. Mon. Mag. **65**: 107.

14. *Rhyopsocus pandanicola* Thornton, Lee and Chui, n. sp. (fig. 5, a-e)*Macropterous form*

FEMALE: Coloration (after c. 20 years in alcohol). Head brown. Eyes black; ocelli pale, dark brown along inner margins. Sub-basal segment of maxillary palp pale basally. Scape and pedicel brown, flagellum pale brown. Median epicranial and fronto-clypeal sutures dark brown. Pro- and mesothoracic terga brown, metathoracic terga paler. Pleura brown. Legs brown, tibia apically and tarsus paler brown. Forewings uniform yellowish-brown, except a wide oblique hyaline band near base (fig. 5, a) and a narrow hyaline line along *cu*₂; hindwing much paler, uniform (fig. 5, b). Abdomen pale buff, grey-brown transverse bands dorsally, grey-brown pigment laterally.

Morphology. Scattered hairs on head, eyes bare. Head and pro- and mesothoracic terga shining. Antero-lateral angles of mesothoracic dorsum each produced into a boss, scutellum distinct. Forewings reaching beyond abdominal apex; anal lobe strongly angulate, posterior wing margin excised at end of *an*, venation as in fig. 5, a. Basal hind tarsal segment without ctenidiobothria, Pearman's organ lacking. Subgenital plate (fig. 5, e) simple, setose. Gonapophyses (fig. 5, e) consisting of but a single pair of setose somewhat rectangular valves. Epiproct sharply triangular, with a pair of long setae along each lateral side, a more widely-spaced pair along basal edge. Paraprocts with a drum-shaped apical prominence, and a field of five trichobothria in rosette sockets. No dorsal lobes or prongs on dorsal apex of abdomen.

Body length (in alcohol): 1.0 mm (average of 5 specimens, range 0.9–1.1 mm).

MALE: Coloration. As female.

Morphology. Eyes as female. Genitalia: Hypandrium simple, straight-edged apically (fig. 5, d), penial sclerites divergent anteriorly (fig. 5, d). No dorsal lobes or prongs on dorsal apex of abdomen.

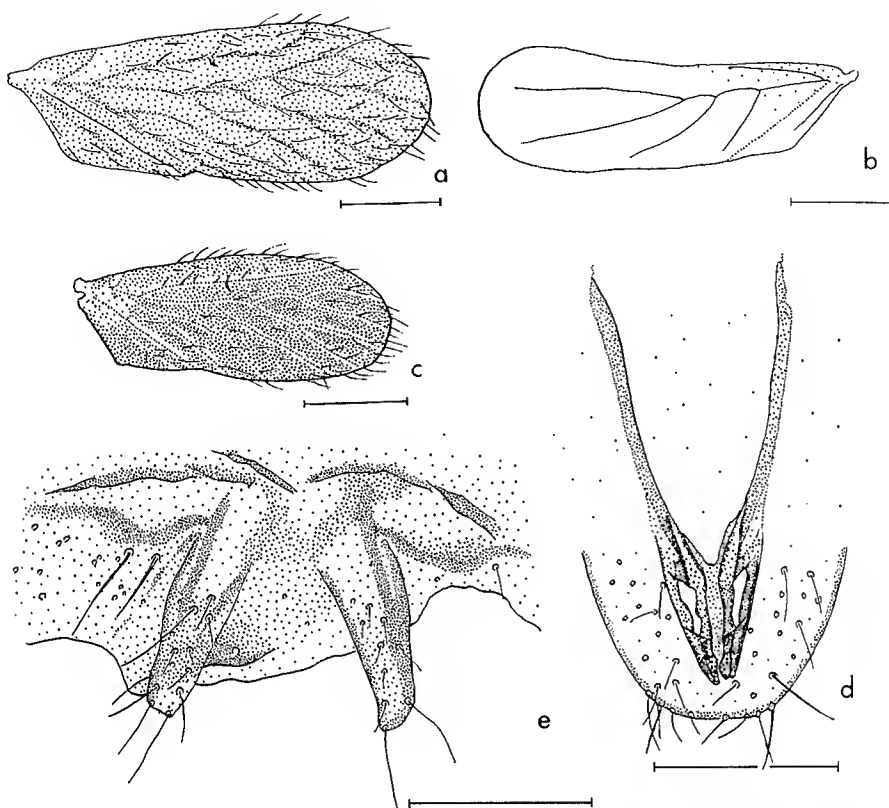


FIGURE 5.—*Rhyopsocus pandanicola*, macropterous form: **a**, forewing; **b**, hindwing; brachypterous form: **c**, forewing; macropterous form: **d**, male genitalia; **e**, female gonapophyses. Scales a-c = 0.2 mm; d-e = 0.1 mm.

Body length (in alcohol): 1.0 mm (average of 5 specimens, range 0.8–1.1 mm).

Brachypterous form

As macropterous form in coloration and morphology, except that wings when folded back leave abdominal apex exposed and are rather darker in color (fig. 5, c). Ocelli smaller, only two trichobothria on each paraproct.

Holotype, ♀ (FM), Saipan, Mariana Is., Tagpochau, 375 m, beating *Pandanus* day-flowering body, Feb. 18, 1945, Dybas. Allotype, ♂ (FM), same data. Paratypes, Saipan: as Mahetog area, Jan. 30, 1945; SW, beating, May 7, 1945; As Mahetog area, sifted from *Pandanus* fruit, and in decaying crown of *Pandanus* leaves, Mar. 4, 1945; As Mahetog area, sifting in *Pandanus* clump, Apr. 22, 1945; near Garapan, beating, Jan. 19, 1945; Mt. Tagpochau, 1 mile NNE of summit, beating, Jan. 18, 1945; all by Dybas. Tinian: NW slope Mt. Lasso, beating, Apr. 1, 1945, Dybas. Guam: Pt. Oca, overripe *Pandanus* fruit, Jan. 9, 1945, Gressitt and G.E. Bohart. Additional specimen,

Ujae Atoll, Ebeju I., in axils of *Pandanus* leaves, Mar. 8, 1952, Fosberg.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian, Guam), Marshall Is. (Ujae).

Roesler (1944) considered *Rhyopsocopsis* Pearman 1929 and *Deipnopsocus* Enderlein 1903 as subgenera of *Rhyopsocus* Hagen 1876. Badonnel (1949) synonymized *Deipnopsocus*, and Mockford and Gurney (1956) *Rhyopsocopsis*, with *Rhyopsocus*.

This species differs from all other species of the genus except *Rhyopsocus peregrinus* (Pearman, 1929) and *Empheriella denervosa* Enderlein 1912 (redecribed by Enderlein in 1931) which is probably congeneric, in the shape of the anal lobe of the forewing. In this it is closer to *R. peregrinus*, having a distinct excision at the end of the anal vein; moreover, as in *R. peregrinus*, the margin of the anal lobe lacks setae. It differs from *R. peregrinus* in lacking vein r_1 in the hindwing, even in the macropterous form, and in coloration.

R. peregrinus was described from a single specimen collected in a banana store in England, and was probably introduced. *E. denervosa* occurs in the Seychelles. Other related species occur in Africa and Peru; a single species taken on Kerguelen Island was probably introduced from North America, where three other species occur.

Mockford and Gurney (1956) described the short-winged *R. squamosus* from Texas. The discovery of the present dimorphic species confirms their view that *squamosus* is a brachypterous *Rhyopsocus*. *R. pacificus* has longer wings than *R. squamosus* even in the brachypterous form, and differs in coloration.

This species seems to be particularly associated with *Pandanus*, having been taken in association with this plant on numerous occasions.

FAMILY PSYLLIPSOCIDAE Enderlein, 1911

CHARACTERISTICS: Wings often reduced; hind tibia and tarsus together longer than abdomen; head long, vertical; antenna with more than 20 segments; scales lacking.

Genus *Psyllipsocus* Selys-Longchamps

Psyllipsocus Selys-Longchamps, 1872, Ent. Mon. Mag. **9**: 145. —Gurney, 1943, Ann. Ent. Soc. Amer. **36** (3): 203.

Nymphopsocus Enderlein, 1930, Zool. Anz. **27**: 76.

Parempheria Enderlein, 1906, Stettin. Ent. Ztg. **67**: 306.

Ocelloria Weber, 1906, New York Med. J. **84**: 885.

Ocellatoria Weber, 1907, Ent. News **18**: 189.

Fita Navas, 1913, Rev. Acad. Madr. **12**: 332.

Fabrella Lacroix, 1915, Bull. Soc. Ent. Fr. **1915**: 194.

15. *Psyllipsocus ramburii* Selys-Longchamps

- Psyllipsocus ramburii* Selys-Longchamps, 1872, Ent. Mon. Mag. **9**: 145. —Gurney, 1943, Ann. Ent. Soc. Amer. **36** (2): 206. —Badonnel, 1943, Faune Fr. **42**: 130; 1955, Publ. Cult. Cia. Diamant Angola **26**: 34. —Banks, 1942, Bull. Bishop Mus. **172**: 28.
- Nymphopsocus destructor* Enderlein, 1903, Zool. Anz. **27**: 76.
- Ocelloria gravonymphia* Weber, 1906, New York Med. J. **84**: 885.
- Ocellatoria gravinympa* Weber, 1907, Ent. News **18**: 189.
- Nymphopsocus troglodytes* Enderlein, 1909, Arch. Zool. Exp. Gen. **1** (5): 536.
- Fita vestigator* Navas, 1913, Rev. Acad. Madr. **12**: 333.
- Fabrella convexa* Lacroix, 1915, Bull. Soc. Ent. Fr. **1915**: 194.

DISTRIBUTION: Widespread.

This widespread species was recorded from Guam by Banks.

FAMILY PACHYTROCTIDAE Pearman, 1936

CHARACTERISTICS: Body globular; femora not swollen, integument often sculptured; compound eyes always fairly large and hemispherical; meso- and metathorax always separated; apterous or winged; antennae of 15 segments, those of flagellum ringed; pterostigma present in fore wing but undifferentiated.

KEY TO MICRONESIAN GENERA OF PACHYTROCTIDAE

- In hindwing, vein r_1 present; subgenital plate without a T-shaped sclerite.....***Pachytroctes***
 In hindwing, vein r_1 absent; subgenital plate with a T-shaped sclerite.....***Tapinella***

Genus *Pachytroctes* Enderlein

- Pachytroctes* Enderlein, 1905, In Jagerskiold, L.A. Results of the Swedish Zoological Expedition to Egypt and the White Nile, 1901, No. 18: 46. —Roesler, 1944, Stettin. Ent. Zt. **105**: 135.
- Psacadium* Enderlein, 1908, Zool. Anz. **33**: 777.
- Peritroctes* Ribaga, 1911, Redia **7**: 162.
- Nymphotroctes* Badonnel, 1931, Bull. Soc. Zool. Fr. **56**: 342.
- Nanopsocus* Pearman, 1928, Ent. Mon. Mag. **64**: 133.

16. *Pachytroctes insularis* Thornton, Lee & Chui, n. sp. (fig. 6, a, b; 7, a, b)*Macropterous form*

FEMALE: Coloration (after c. 20 years alcohol storage). Head generally fairly dark brown, slightly darker adjacent to eyes and on vertex. Ocelli pale, bordered brown; eyes dark brown. Maxillary palps fairly dark brown, apical segment pale cream in apical half. Antenna with scape and pedicel fairly dark brown, flagellar segments much paler brown, proximal two segments hyaline basally, fifth flagellar segment and succeeding segments with distinct hyaline rings. Thorax wholly fairly dark brown, including legs, except apex of tibia paler and tarsal segments progressively paler. Forewing more or less uniformly brown, rather paler brown adjacent to the brown veins, rather darker areas within most of cells. Hindwing paler brown than fore wing. Abdomen brown, broad annulations evident ventrally.

Morphology. Lacinia with three tines, two much longer than the third. Upper surface of head sinuous in front view, a blunt projection adjacent to each eye. Median epicranial suture distinct. Apical segment of maxillary palp with a group of about 8 sensilla. Head sculptured

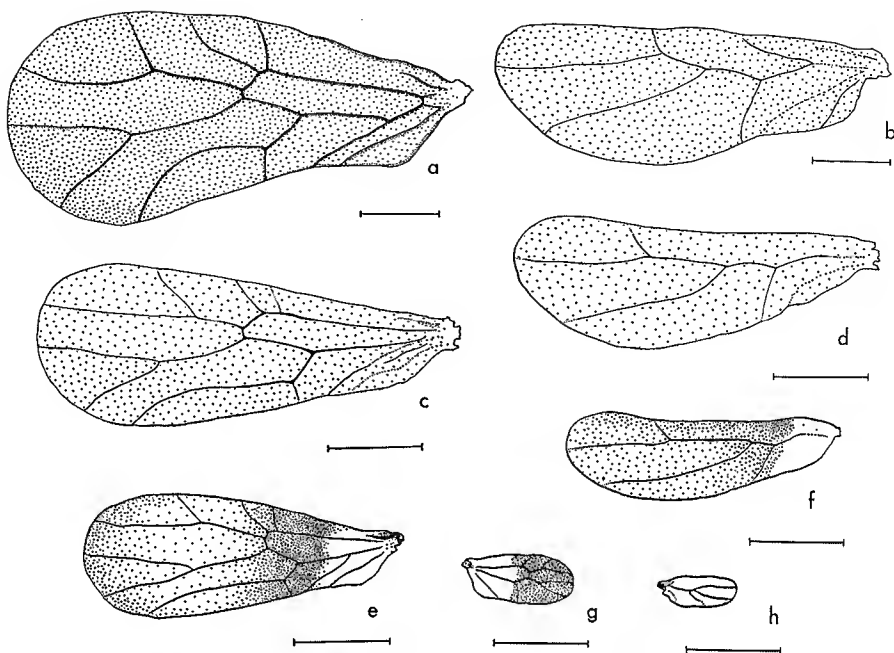


FIGURE 6.—*Pachytroctes insularis*: a, forewing; b, hindwing; *Tapinella mariana*: c, forewing; d, hindwing; *T. pictipenna*, macropterous form: e, forewing; f, hindwing; micropterous form: g, forewing; h, hindwing. Scales a–b = 0.2 mm; c–h = 0.3 mm.

with close-set short chitinous rods, and sparsely and fairly uniformly beset with very short stout setae. Eyes with chitinous rods between ommatidia. Anterior leg with broad femur, tibia no longer than femur; hind tibia distinctly longer than femur, which is narrower than that of anterior legs. Pearman's organ lacking. Wings (fig. 6, a, b), as those of *Pachytroctes ealensis* Bad., in fore wing areola postica relatively high, cu_1 distinctly convex, fork of rs strongly divergent, wing completely bare. Hindwing with posterior edge strongly curved. Gonapophyses as in fig. 7, a. Subgenital plate without sclerotized bar. Paraprocts with three trichobothria without rosette sockets; epiproct triangular, with symmetrical chaetotaxy (fig. 7, b).

Body length (in alcohol): 1.4 mm.

Apterous form

FEMALE: Differs from the above, apart from in lacking wings, in possessing a single trichobothrium on paraprocts and lacking ocelli. Also differs in coloration, head generally darker; prothoracic tergum dark brown, remaining terga whitish cream, corresponding pleura concolorous; legs dark brown except femur apically and tibia basally whitish cream (this cream coloration much less extensive on posterior leg). Thoracic terga each with a pair of lateral prominences, these quite large, and distinct lobes on metathorax.

Body length (in alcohol): 1.2 mm (average of 9 specimens, range 0.7–1.6 mm).

MALE: Unknown.

Holotype, ♀ (FM), Mariana Is., Saipan, near Garapan, under bark, Dec. 24, 1944, Dybas (both forms). Paratypes, Saipan: Chalan Laulau area, under boards, Jan. 24, 1945, Dybas, (macropterous form). Tinian: NW slope, Mt. Lasso, under bark, Mar. 17, 1945, Dybas (apterous form).

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian).

The apterous and fully winged forms of this species agree in all details of morphology except those known to be associated with aptery. The difference in pigmentation of the legs is not considered sufficient grounds for regarding the forms as distinct species, particularly in view of the fact that both were taken together on Saipan under bark. The two other collections were from similar habitats.

Badonnel (1949) described a *Pachytroctes* species from the Congo which possessed fully winged and apterous forms, all females. The species described above, according to the criteria suggested by that author and by Pearman (1932) should be placed in *Pachytroctes* rather than in *Tapinella*.

From Enderlein's description and figure, (Enderlein, 1903), it appears that the eyes of *Psylloneura simbangana* are small, as in *Pachytroctes*, not extending beyond the margin of the vertex, and there has been difficulty in distinguishing these two genera since the discovery of winged *Pachytroctes*. There is no information on the genitalic features of *Psylloneura*. However, although not included in the generic diagnosis, the shape of the hindwing of *P. simbangana*, the type species of *Psylloneura*, is distinctive.

For this reason, we have placed the present species in *Pachytroctes* rather than in *Psylloneura*. It is possible that this is the species recorded from Guam by Banks (1942), under the name *Psylloneura simbangana*, from which it differs in the shape of the hindwing, and body color. *P. insularis* differs from *P. ealensis* Bad. in coloration, and in epiproct chaetotaxy.

Genus *Tapinella* Enderlein

Tapinella Enderlein, 1908, Zool. Anz. **33**: 772.

KEY TO MICRONESIAN SPECIES OF TAPINELLA

1. Fore and hindwings with hyaline basal quarter, pale brown in distal half, darker brown between these regions.....**19. pictipenna**
Fore and hindwings of uniform coloration.....2
2. Thorax with grey-brown longitudinal pleural stripe, abdomen with double line of grey-brown spots each side.....**18. mariana**
Thorax and abdomen uniform in color.....**17. formosana**

17. *Tapinella formosana* Enderlein

Tapinella formosana Enderlein, 1908, Zool. Anz. **33**: 774. —Menon, 1942, Indian J. Ent. **4**: 32.

Psylloneura williamsi Banks, 1931, Proc. Hawaii Ent. Soc. **7** (3): 439. —Williams, 1931, Proc. Hawaii Ent. Soc. **7** (3): 371. —Zimmerman, 1948, Insects of Hawaii **2**: 230; 1957, Insects of Hawaii **6**: 179.

DISTRIBUTION: India, Taiwan, Micronesia, Hawaii.

S. MARIANA IS. SAIPAN: Laulau Bay area, beating mango tree, Dec. 1944; Chalan Laulau area, under boards, Jan. 1945; As Mahetog area, Jan. 1945; As Mahetog area, sifting decaying banana stems and leaves, Apr. 1945; all by Dybas. TINIAN: Mar. 1945; NW slope Mt. Lasso, beating vegetation, Mar. 1945, Apr. 1945; all by Dybas.

18. *Tapinella mariana* Thornton, Lee and Chui, n. sp. (fig. 6, c, d; 7, c, d)

FEMALE: Coloration (after c. 20 years in alcohol). Wholly buff, with following exceptions: grey-brown mark from orbit to antennal socket, continuing to fronto-clypeal suture, apical segment of maxillary palp grey-brown in basal 2/3, grey-brown longitudinal pleural stripe each side of thorax, double line grey-brown spots each side of abdomen. Eyes black, ocelli pale. Forewing uniformly pale, hindwing paler.

Morphology. I.O.: D. = 4.5: 1. Venation of wings as in fig. 6, c, d. Pearman's organ lacking. No ctenidiobothria on tarsi. Gonapophyses (fig. 7, c) as usual for the genus, with fleshy dorsal valve. Subgenital plate (fig. 7, d) with row of quite stout setae along posterior margin; T-shaped sclerite with long, curved arms; anterior to this short setae fairly evenly distributed. Epiproct with a well-defined group of stout setae anteriorly, anterior margin sclerotized.

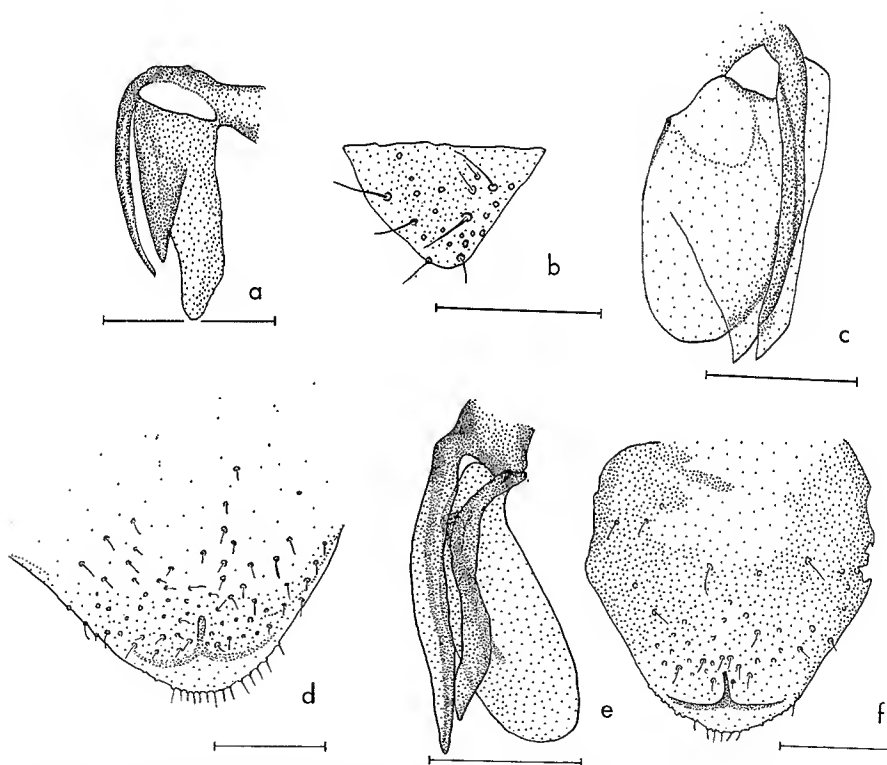


FIGURE 7.—*Pachytroctes insularis*: a, gonapophyses; b, epiproct; *Tapinella mariana*: c, gonapophyses; d, subgenital plate; *T. pictipenna*: e, gonapophyses; f, subgenital plate. Scales a-b, d, f = 0.1 mm; c, e = 0.05 mm.

Body length (in alcohol): 1.2 mm (2 specimens). Abdomen longer than head and thorax combined, fusiform.

MALE: Unknown.

Holotype, ♀ (FM), Mariana Is., Tinian, NW slope Mt. Lasso, Apr. 4, 1945 Dybas.

DISTRIBUTION: S. Mariana Is. (Tinian).

19. *Tapinella pictipenna* Thornton, Lee and Chui, n. sp. (fig. 6, *e-h*; 7, *e,f*)

Macropterous form

FEMALE: Coloration (after c. 20 years in alcohol). Head light brown, darker on vertex than frons, a grey-brown band from orbit to antennal socket, clypeus paler in mid-line. Eyes black; ocelli pale, brown along inner margins. Maxillary palps and antennae very pale buff. Median epicranial and frontal sutures dark brown. Thoracic terga light brown; pleura with wide dark grey-brown longitudinal band each side. Legs: femur light brown except basally very pale cream, tibia light brown except apically very pale cream, other segments pale cream. Forewing (fig. 6, *e*) pale brown in distal half, hyaline in basal quarter, darker brown between these two regions; vein pigmentation similar to adjacent membrane, indistinct. Hindwing similarly marked, but brown parts paler. Abdomen creamy-buff, except each side a wide dark grey-brown longitudinal band.

Morphology. I.O.: D. = 4.5: 1. Wing venation as in fig. 6, *e, f*. Pearman's organ lacking. No ctenidiobothria on tarsi. Gonapophyses (fig. 7, *e*) with fleshy dorsal valve. Subgenital plate (fig. 7, *f*) with row of quite long setae along posterior margin; T-shaped sclerite with very long curved arms. Epiproct with a group of stout setae anteriorly. Paraprocts each with a group of four trichobothria in large sockets and one in a smaller socket, on a raised protuberance.

Body length (in alcohol): 1.1 mm (2 specimens).

Micropterous form

Differs from above, apart from in microptery (fig. 6, *g, h*), in having but a single trichobothrium on the raised area of each paraproct.

MALE: Unknown.

Holotype, ♀ (Macropterous), (FM), Mariana Is., Saipan, As Mahetog area, sifting decaying banana stems and leaves, Apr. 22, 1945. Paratype ♀ (micropterous), (FM), same data.

DISTRIBUTION: Luzon, S. Mariana Is. (Saipan).

This species was also collected by I.W.B.T., beating dead rattan and banana leaves at Los Baños, Luzon, the Philippines, on Apr. 7, 1965. The wing and body markings are quite distinctive.

FAMILY CAECILIIDAE Pearman, 1936

CHARACTERISTICS: Head relatively short and wide; venation complete, areola postica free from media; veins and wing margins setose; tarsi two-segmented; female gonapophyses reduced.

Genus *Caecilius* Curtis

Caecilius Curtis, 1837, British Entomology (14): 648, (see Mockford, 1965 Trans. Amer. Ent. Soc. 91: 121-166).

KEY TO MICRONESIAN SPECIES OF CAECILIUS

1. Head with broad dark median stripe on frons and clypeus; eyes reddish orange, kidney-shaped **22. casarum**
Head not marked as above; eyes normal.....2
2. Forewing of uniform pale color.....3
Forewing with brown pigment, at least in anal area, and paler areas.....4
3. Areola postica extremely small, its height less than half that of pterostigma **23. novoguineensis**
Areola postica height more than half that of pterostigma..... **21. arotellus**
4. Brown pigment of forewing confined to anal area, wing otherwise not patterned.....5
Brown pigment on forewing not confined to anal area.....7
5. In forewing, fusion of *rs* and *m* extremely short, or a point junction..... **30. pseudanalis**
In forewing, *rs* and *m* fused for a length greater than distance between costa and subcosta6
6. Head sclerites and thoracic terga shining, glossy..... **27. leuroceps**
Head sclerites and thoracic terga not shining..... **20. analis**
7. In at least distal half of forewing, posterior veins clearly bordered with brown pigment8
Veins of forewing without definite borders of brown pigment.....11
8. Pterostigma unpigmented, vertex not very sharply angled; fore wing less than 2.5 mm long9
Pterostigma pigmented within its distal posterior border, vertex sharply angled; fore wing more than 2.5 mm long..... **28. marginatus**
9. Radial fork of forewing without pigmented border.....10
Radial fork of forewing, as media, with pigmented border..... **24. apicatus**
10. Pattern in basal half of forewing sharply defined; a band of pigment extends from media to areola postica..... **26. kraussi**
Pattern in basal half of forewing rather diffuse; areola postica pigment not extending to media..... **31. trukensis**
11. Head uniform buff; pigment in apical half of forewing confined to margin, no large brown patch in basal half..... **25. fuscipennis**
Vertex brown, frons and clypeus buff, sharp demarcation of pigment between orbits; apical half of forewing, except pterostigma, uniformly pigmented, a large dark brown patch in basal half..... **29. marianus**

20. *Caecilius analis* Banks.

Caecilius analis Banks, 1931, Proc. Hawaii Ent. Soc. 7 (3): 437. —Williams, 1931, Proc. Hawaii Ent. Soc. 7 (3): 371. —Swezey and Williams, 1932, Proc. Hawaii Ent. Soc. 8 (1): 190. —Zimmerman, 1948, Insects of Hawaii 2: 232. —Davis, 1952, Proc. Hawaii Ent. Soc. 15 (1): 85. —Zimmerman, 1957, Insects of Hawaii 6: 179.

DISTRIBUTION: N. Mariana Is. (Pagan), S. Mariana Is. (Saipan, Tinian, Rota), Caroline Is. (Ponape, Kusaie), Marshall Is. (Lae, Lib Island, Ailinglapalap, Arno), Hawaii.

N. MARIANA IS. PAGAN: Jul. 1951, R.M. Bohart.

S. MARIANA IS. SAIPAN: As Mahetog area, Jan. 1945, Dybas; hills east of Garapan, beating, Jan. 1945, Dybas; Talofoto ridge, sweeping on open hillside, Jan. 1945, Dybas. TINIAN: NW slope Mt. Lasso, Apr. 1945. ROTA:

Jun. 1951, R.M. Bohart.

PONAPE. Dec. 1937, Esaki; Kolonia, Jan. 1938, Esaki; Ag. Exp. Sta., Kolonia Jun-Sep. 1950, Adams; Tolenat Peak, 198 m, Jun-Sep. 1950, Adams; Ag. Exp. Sta., Kolonia, Jan. 1953, Gressitt; Nanponmal, 50 m, Jan. 1953, Gressitt; Jokaj I., 2 m, Jan. 1953, Gressitt.

KUSAIE. Mutunlik (Yepan), light trap, Jan. 1953, Gressitt; Mutunlik, 22 m, Jan. 1953, Clarke; Funnaunpes, 1 m, Jan. 1953, Clarke; Hill 1010, 300 m, Feb. 1953, Apr. 1953, Clarke; Mt. Matantes, S. slope, 380 m, Mar. 1953, Clarke; Hill 541, 165 m, Mar. 1953, Clarke; Mutunlik, 22 m, beating dry banana leaves, Mar. 1953, Clarke.

MARSHALL IS. LAE ATOLL: Lae I., Oct. 1953. LIB ISLAND: Oct. 1953. AILINGLAPALAP ATOLL: Bigatyelang I., Aug. 1946, Townes; near Airek, Mar. 1946, Townes. ARNO ATOLL: Ine I., sweeping *Polypodium*, May 1950, La Rivers.

This is one of the commonest psocids in the Hawaiian Islands. It has successfully colonized several low atolls in the Marshall Islands.

21. *Caecilius arotellus* Banks.

Caecilius arotellus Banks, 1942, Bull. Bishop Mus. 172: 26.

DISTRIBUTION: S. Mariana Is. (Guam).

Described from Guam by Banks. Not present in the collection before us.

22. *Caecilius casarum* Badonnel

Caecilius casarum Badonnel, 1931, Ann. Sci. Nat. Zool. ser. 10 14: 234.

Caecilius palmarum Mockford and Gurney, 1956, J. Wash. Acad. Sci. 46: 361.

DISTRIBUTION: Mozambique, Hong Kong, Samoa, Fiji, Hawaii, S. United States, coastal areas of new world tropics and subtropics, S. Mariana Is. (Saipan, Tinian), Caroline Is. (Yap, Ulithi Atoll), Marshall Is. (Eniwetok, Kwajalein, Majuro), Gilbert Is. (Butaritari, Marakei, Tarawa, Kuria).

S. MARIANA IS. SAIPAN: Laulau Bay area, beating mango, Dec. 1944, Dybas; As Mahetog area, Jan. 1945, Dybas; near Garapan, beating, Jan. 1945, Dybas; at light, May 1945, Dybas; As Mahetog area, Apr. 1945, at light, May, 1945, Dybas. TINIAN: Apr. 1945, Dybas.

YAP. MAP: coconut palm, Aug. 1950, Goss.

CAROLINE ATOLLS. ULITHI: Falalap I., May 1952, Krauss.

MARSHALL IS. ENIWETOK: Japtan I., Feb. 1957, Tuthill. KWAJALEIN: Kwajalein I., Sep. 1945, Clagg. MAJURO: Jul. 1950, La Rivers.

GILBERT IS. BUTARITARI: Dec. 1957, Krauss. MARAKEI: Dec. 1957, Krauss. TARAWA: Bairiki I. Banraeaba, Teoraereke, Dec. 1957, Krauss. KURIA: Kuria I., Nov. 1964, light trap, Perkins.

This species has a broad dark stripe down the middle of the frons and

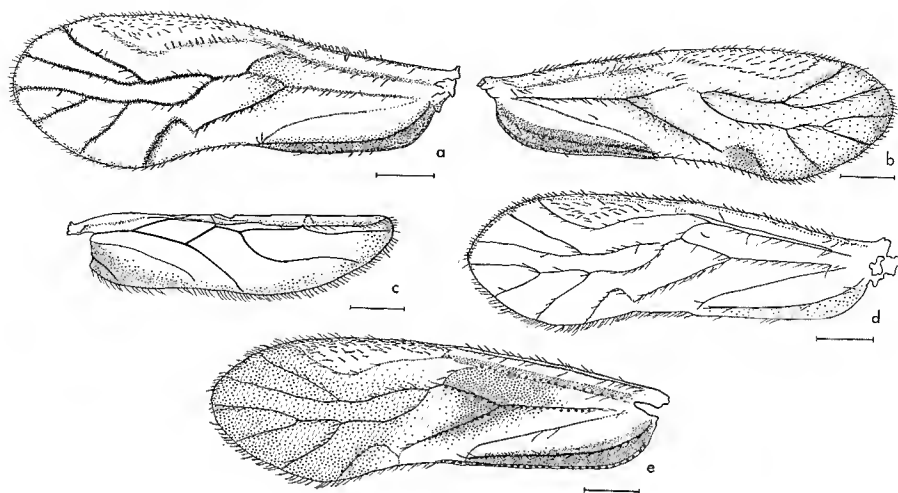


FIGURE 8.—Forewing: **a**, *Caecilius apicatus*; **b**, *C. fuscipennis*; hindwing: **c**, *C. fuscipennis*; forewing: **d**, *C. leurocephs*; **e**, *C. marianus*. Scales = 0.3 mm.

clypeus, and the orange-rust eyes are kidney-shaped, not spherical. It is a widespread tropicopolitan species and has successfully colonized low atolls in the Marshall and Gilbert groups.

23. *Caecilius novoguineensis* Enderlein.

Caecilius novoguineensis Enderlein, 1903, Ann. Hist.-Nat. Mus. Hung. 1: 276.

DISTRIBUTION: New Guinea, recorded by Karny from Fiji and Samoa, Bonin Is. (Chichi Jima), Caroline Is. (Palau).

BONIN IS. CHICHI JIMA: Omura, "Camp beach", May 1958, Jun. 1958, Snyder.

PALAU. KOROR: SW, 25 m, light trap, Dec. 1952, Gressitt; NW, 40 m, limestone ridge, Dec. 1952, Gressitt; at light, Jun. 1958, Beardsley; sweeping, Mar. 1954, Beardsley. PELELIU: Amiangal Mt., light trap, Dec. 1952, Gressitt.

This species was described from New Guinea. The single specimen from the Bonins has a slightly larger areola postica than those from Palau.

24. *Caecilius apicatus* Thornton, Lee and Chui, n. sp. (fig. 8, *a*; 12, *a,c*)

MALE: Coloration (after c. 10 years dry storage). Head buff, except frons anterior to ocelli and clypeus brown, eyes black, flagellum dark brown. Thoracic terga and pleura brown. Legs pale buff, except apical tarsal segment brown. Forewing (fig. 8, *a*) hyaline; veins *cu* and connection of *m* + *cu* to *rs* + *m* with adjacent cloudy brown pigment, veins in apical half of wing brown, with narrower border of brown pigment, other veins pale brown, anal cell suffused with brown pigment. Hindwing hyaline, veins brown. Abdomen buff.

Morphology. I.O.: D. = 0.5: 1; eyes large, slightly notched opposite antennal bases. Head sclerites glossy. Thoracic terga and pleura glossy. Number of etenidiobothria on basal hind tarsal segment: 24. Areola postica in forewing quite high. Genitalia: Hypandrium (fig.

12, a) setose, longer stout setae at lateral edges. Penis frame (fig. 12, c) with slight peg-like inner projections at base of parameres. A field of 25 trichobothria and a more apical field of minute fine setae on each paraproct.

Body length (after softening in alcohol): 1.4 mm.

FEMALE: Unknown.

Holotype, ♂ (BISHOP 9524), Moen I., Truk, Caroline Is., Mt. Teroken, light trap, breadfruit grove, 80 m, Feb. 5, 1953, Gressitt.

DISTRIBUTION: Caroline Is. (Truk).

This large species has only been taken from Truk.

25. *Caecilius fuscipennis* Thornton, Lee & Chui, n. sp. (fig. 8, b, c; 10, a; 11, b)

FEMALE: Coloration (after c. 12 years dry storage). Head pale buff, eyes black, ocelli pale. Two basal segments of flagellum pale buff, remaining segments dark brown. Maxillary palps pale buff. Thoracic terga brown, wide median cream band. Pleura light brown. Legs very pale buff. Forewing (fig. 8, b) marked with dark brown cloudiness along distal half of $m + cu$, cu , and in anal cell and apical half of areola postica; veins m and rs and their apical branches brown, basal sections of costa and of vein r brown, veins otherwise very pale except in regions of brown pigment. Hindwing hyaline, fuscous in anal cell (fig. 8c), vein r and cu_2 and ax very pale, other veins brown. Abdomen buff.

Morphology. I.O.: D. = 2.2: 1. Number of ctenidiobothria on basal hind tarsal segment: 19. Subgenital plate (fig. 11, b) with discreet conical low lateral apophyses, pigmented area wide. Gonapophyses (fig. 10, a) with ventral valve rather straight. A field of 17 trichobothria on each paraproct.

Body length (after softening, in alcohol): 1.5 mm.

MALE: Coloration (after c. 6 years dry storage). As female, except two basal segments of flagellum brown, other segments successively darker.

Morphology. I.O.: D. = 0.3: 1, eyes very large. Genitalia: hypandrium simple, setose; penis frame as that of *C. apicatus*. A field of 23 trichobothria on each paraproct, and a field of minute spines on mesial surface, also on dorsal surface of epiproct between two stout setae.

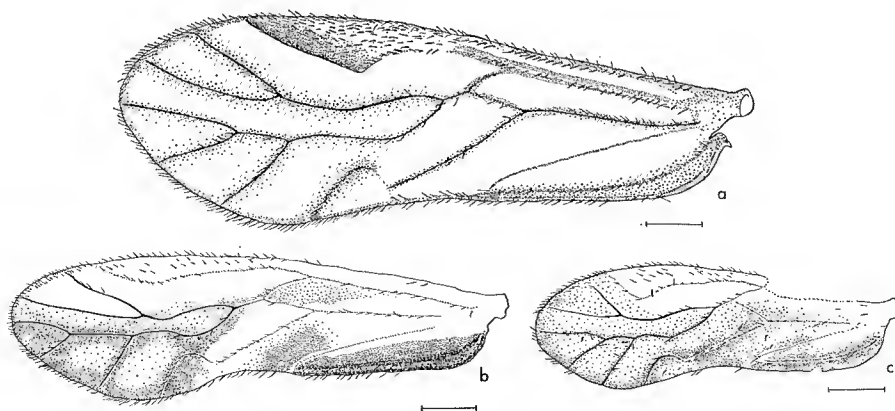


FIGURE 9.—Forewing: a, *Caecilius marginatus*; b, *C. kraussi*; c, *C. trukensis*. Scales = 0.3 mm.

Body length: (after softening in alcohol): 1.4 mm.

Holotype, ♀ (US 71408), Peleliu, Caroline Is., Palau, Mt. Amiangal, Dec. 23, 1952, Gressitt. Allotype, ♂ (BISHOP 9525), Koror, sweeping, Mar. 1954, Beardsley. Paratypes, Palau: Babelthuap; E. Ngatpang, 65 m, Dec. 10, 1952, Gressitt; Ngardmau, May 10, 1957, Sabrosky, Koror: Jul. 17, 1945, Townes; Dec. 1952, Beardsley; light trap, 25 m, Dec. 12, 1952, Gressitt; Jan. 1953, Beardsley; at light, Feb. 20, 1953; Jan. 1954, Beardsley; Feb. 7, 1954, Beardsley; Apr. 15–21, 1957, Sabrosky; Ulebsehel: SE on wet limestone rocks, and on beach, Apr. 24, 1957, Sabrosky. Yap: Yap I., Oct. 1952, Krauss.

DISTRIBUTION: Caroline Is. (Palau, Yap).

This species is closely similar to *Caecilius trukensis*. However, it is larger and differs in details of the forewing pattern.

26. *Caecilius kraussi* Thornton, Lee & Chui, n. sp. (fig. 9, b; 10, b)

FEMALE: Coloration (after c. 12 years dry storage). Head and body pale straw, with following exceptions: head anterior to a line joining orbits very dark brown, including frons, clypeus and labrum; apices of apical segments of maxillary palps dark brown; fourth flagellar segment brown, succeeding segments progressively darker; mesothoracic terga brown with narrower cream median line. Eyes black, ocelli pale. Forewing distinctly marked with brown (fig. 9, b), veins dark in pigmented areas, very pale in other areas, hindwing hyaline.

Morphology. I.O.: D. = 1.5: 1; eyes ovoid, transverse diameter shorter than longitudinal one. Ocelli very small, closely grouped. Venation of forewing as in figure 9, b. Basal hind tarsal segment with 19 ctenidiobothria. Subgenital plate with lateral apophyses not projecting beyond margin. Gonapophyses (fig. 10, b). A field of 15 trichobothria on each paraproct.

Body length (after softening, in alcohol): 1.8 mm.

MALE: Coloration (after c. 12 years dry storage). As female, except flagellum wholly dark brown.

Morphology. I.O.: D. = 0.5: 1; eyes ovoid but less narrow than female. Ocelli as female. Venation of forewing as female. Basal hind tarsal segment with 24 ctenidiobothria. Genitalia: hypandrium very similar to that of *C. apicatus*, with long stout setae on posterior margin laterally. Peg-like projections of penis frame not visible. A field of 23 trichobothria on each paraproct.

Body length (after softening in alcohol): 1.6 mm.

Holotype, ♀ (US 71410), Caroline Is., Ulithi Atoll, Falalop I., Oct. 7, 1952, Krauss. Allotype, ♂ (US), Sorol Atoll, Sorol I., Oct. 4, 1952, Krauss. Paratypes, Tobi Island: Sep. 12, 1952, Krauss. Sonsorol Island: Sep. 13, 1952, Krauss. Ulithi Atoll: Mogmog I., Sep. 6, 1952. Woleai Atoll: Woleai I., Sept. 19, 1952; Saliap I., Sep. 1952, Krauss.

DISTRIBUTION: Caroline Is. (Tobi, Sonsorol, Ulithi, Sorol, Woleai).

This distinctive species is apparently confined to low atolls in the western Carolines. It has never been taken on any of the high islands in Micronesia.

27. *Caecilius leuroceps* Thornton, Lee & Chui, n. sp. (fig. 8, d; 10, c; 11, a; 12, d)

FEMALE: Coloration (after c. 20 years dry storage). Head buff, eyes black, apical nine

flagellar segments brown. Thoracic terga brown, pleura and legs buff. Forewing veins (fig. 8, d) brown, membrane suffused with pale brown, slightly darker in anal cell.

Morphology. I.O.: D. = 2.0: 1. Head sclerites shining. Thoracic terga glossy. Number of ctenidiobothria on basal hind tarsal segment: 23. Subgenital plate (fig. 11, a) with low broad lateral apophyses, pigmented area very weakly sclerotized. Gonapophyses (fig. 10, c) with both valves curved. A field of 15 trichobothria on each paraproct.

Body length (after softening in alcohol): 1.5 mm.

MALE: Coloration (after c. 10 years of dry storage). As female, except forewing membrane darker, darker pigment along *m + cu* and basal section of *cu*, paler area posterior to basal half of pterostigma, along *cu*, and *r*. Antennae wholly brown.

Morphology. I.O.: D. = 1.0: 1. Head sclerites shining. Thoracic terga glossy, number of ctenidiobothria on basal hind tarsal segment: 23. Genitalia: Hypandrium with fairly straight posterior edge, a group of setae on each side placed extremely laterally. Penis frame (fig. 12, d) outer parameres with c. 15 hyaline, tubercles subapically. Epiproct without papillar field. A field of 17 trichobothria and a field of minute papillae on each paraproct.

Body length (after softening in alcohol): 1.4 mm.

Holotype, ♀ (US 71409), Mariana Is., Guam, Ritidian, Oct. 1957, Krauss. Allotype, ♂ (KU), Saipan, Garapan, Sadog Tasi, May 5, 1940 Yasumatsu. Paratypes, Saipan: As Mahetog area, May 4, 1945, Dybas. Guam: Machanao, Jun. 8, 1936, Swezey; Pt. Oca, May 15, 1945, Bohart; Mt. Alifan, Apr. 1946, Krauss; Talofofo, Aug. 1952, Krauss; Yigo, Oct. 1957, Krauss; Barrigada,

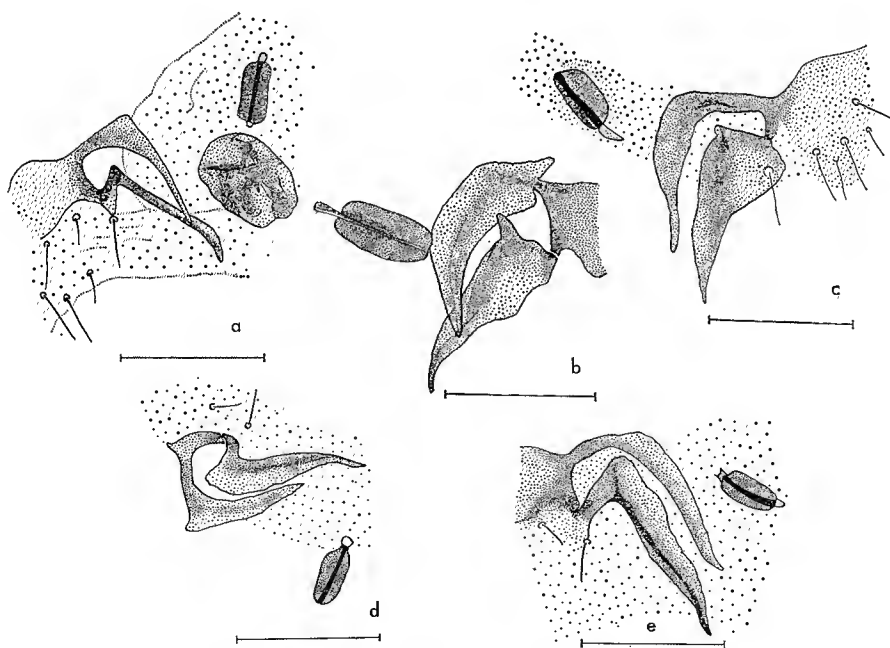


FIGURE 10.—Female gonapophyses: a, *Caecilius fuscipennis*; b, *C. kraussi*; c, *C. leuroceps*; d, *C. pseudanalis*; e, *C. marianus*. Scales 0.1 mm.

Oct. 1957, Krauss; Yigo, Feb. 1958, Krauss; Mt. Lamlam, Feb. 1958, Krauss; Mt. Lamlam, Dec. 1958, Krauss.

DISTRIBUTION: S. Mariana Is. (Saipan, Guam).

This fairly large species exhibits considerable variation in the degree of pigmentation of the forewing, but in general, that of the male is more heavily pigmented than the female. In the glossy head sclerites and thoracic terga, as well as in the general pattern of pigmentation of the fore wing, this species is similar to *C. badiostigma* Okamoto which occurs in Japan and Hawaii. It differs, however, in the shape of the pterostigma, which is less angular and narrower at the vertex.

This species has been taken in the S. Marianas, and a mutilated specimen from Truk may belong to this species.

28. *Caecilius marginatus* Thornton, Lee & Chui, n. sp. (fig. 9, *a*; 11, *e, f*; 12, *e*)

MALE: Coloration (after c. 12 years dry storage). Head buff, except genae brown, frons with a medium brown mark anterior to ocellar protuberance, clypeus brown, with fine darker brown striae, flagellum very dark brown, almost black. Eyes black, ocelli pale, protuberance brown. Mesothoracic terga very dark brown, almost black, no median pale line, metathoracic terga dark brown. Legs buff, except on all legs apical tarsal segment brown, tibia of prothoracic leg brown in basal half. Forewing (fig. 9, *a*) palc fuscous, veins narrowly bordered with brown pigment except cu_2 and veins bounding pterostigma and areola postica basally, fairly extensive brown pigment within pterostigma postero-distally. Hindwing paler, veins dark. Abdomen brown dorsally with narrow transverse bands, ventrally buff.

Morphology. I.O.:D. = 0.3:1, eyes very large, slightly notched anteriorly opposite antennal bases. Ocellar protuberance elongate, anterior ocellus twice as large as posterior ones. Clypeus and frons shining. Thoracic terga glossy. Anterior tibia swollen subapically, narrowing abruptly apically. Number of ctenidiobothria on hind tarsal segment: 34. Genitalia: hypandrium (fig. 11, *f*) with four regions of sclerotization, setose. Penis frame (fig. 12, *e*) bowed basally, slightly wider medially, with peg-like inner projections at base of parameres. Epiproct with a central sclerotized ridge connecting two long stout setae (fig. 11, *e*). Paraproct with a field of 31 trichobothria, a pair of pointed tubercles or a single one on dorsal margin close to well-marked field of prominent papillae (fig. 11, *e*).

Body length (in alcohol, after softening): 2.4 mm.

FEMALE: Unknown.

Holotype, ♂ (BISHOP 9526), Caroline Is., Palau, Koror, at light, Jan. 1953, Beardsley. Paratypes, Palau: Koror, Oct. 1952, Beardsley; SW, 25 m, light trap, Dec. 5, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau).

This very large member of the *flavidus* group is apparently confined to Palau, and only males have been taken.

29. *Caecilius marianus* Thornton, Lee & Chui, n. sp. (fig. 8, *e*; 10, *e*; 11, *c*; 12, *f*)

FEMALE: Coloration (after c. 6 years dry storage). Head generally buff, vertex brown,

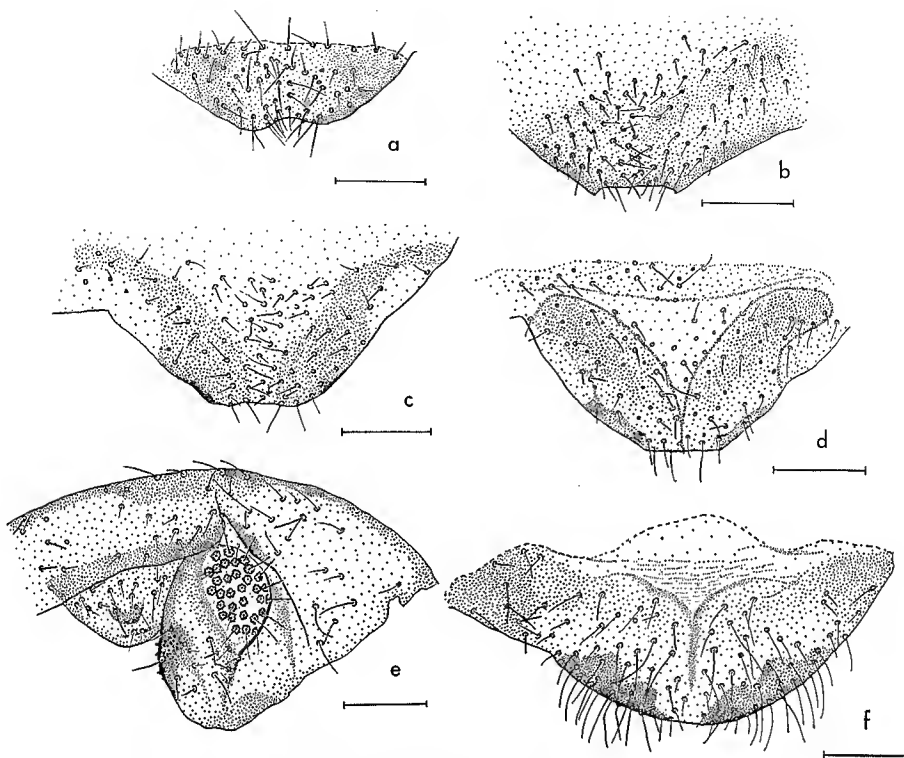


FIGURE 11.—Female subgenital plate: **a**, *Caecilius leuroceps*; **b**, *C. fuscipennis*; **c**, *C. marianus*; **d**, *C. pseudanalis*; *C. marginatus*: **e**, epiproct and paraproct; **f**, hypandrium. Scales = 0.1 mm.

brown area sharply demarcated anteriorly transversely between orbits. Eyes black, ocelli pale. Basal four segments of antenna pale, rest successively darker. Thoracic terga dark brown, an obvious cream arrow-shaped mark on mesothorax. Forewing distinctively patterned with brown and hyaline areas (fig. 8, e). Hindwing pale fuscous, a little darker adjacent to veins.

Morphology. I.O.: D. = 2.2: 1. Ocelli well spaced. Number of ctenidiobothria on basal hind tarsal segment: 24. Thoracic terga shining. Subgenital plate (fig. 11, c) with lateral apophyses barely distinguishable, pigmented area of characteristic shape. Gonapophyses (fig. 10, e) with dorsal valve smoothly curved. An oval field of 16 trichobothria on each paraproct.

Body length (after softening in alcohol): 1.5 mm.

MALE: Coloration (after c. 6 years dry storage). As female.

Morphology. I.O.: D. = 1.0: 1. Number of ctenidiobothria on basal hind tarsal segment: 27. Thoracic terga shining. Genitalia: hypandrium posteriorly with lateral groups of long setae, a bare area medially. Penis frame (fig. 12, f) lacking inner peg-like structure at base of parameres. A field of 20 trichobothria and rather dense field of minute setae with associated pointed spine on each paraproct.

Body length (after softening in alcohol): 1.4 mm.

Holotype, ♀ (BISHOP 9527), Mariana Is., Guam, Mt. Lamlam, Feb. 1958,

Krauss. Allotype, ♂ (BISHOP), Guam, Yigo, Feb. 1958, Krauss. Paratypes, Guam: Pt. Oca, May 15, 1945, Bohart & Gressitt; Mt. Alifan, Apr. 1946, Krauss; Anderson A.F. Base, Aug. 1952, Krauss; Potts Junction, Oct. 1952, Krauss.

DISTRIBUTION: S. Mariana Is. (Guam).

This species has not been taken in Micronesia other than on the island of Guam.

30. *Caecilius pseudanalis* Thornton, Lee & Chui, n. sp. (fig. 10, *d*; 11, *d*; 12, *b, h*)

FEMALE: Coloration (after *c.* 6 years dry storage). As *Caecilius analis*.

Morphology. Number of ctenidiobothria on basal hind tarsal segments: 18–21. Fusion of *rs* and *m* in forewing very short or point junction. Subgenital plate (fig. 11, *d*), lateral apophyses not projecting beyond margin. Gonapophyses (fig. 10, *d*). A field of 16–17 trichobothria on each paraproct.

Body length (after softening in alcohol): 1.5 mm–1.8 mm.

MALE: Coloration (after *c.* 6 years dry storage). As female.

Morphology. Number of ctenidiobothria on basal hind tarsal segment: 26. Forewing as female. Genitalia: hypandrium (fig. 12, *b*) ciliation fairly uniform, except shorter setae medially on margin. Penis frame (fig. 12, *h*) somewhat angular basally, prominent internal peg-like structures at base of parameres. Epiproct and paraproct with prominent fields of large raised papillae. A field of 21 trichobothria on each paraproct.

Body length (after softening in alcohol): 1.4 mm

Holotype, ♀ (BISHOP 9528), Gilbert Is., Tarawa Atoll, Naanikai, Nov. 1957, Krauss. Allotype, ♂ (BISHOP), Tarawa Atoll, Bairiki I., Dec. 1957, Krauss. Paratypes, Butaritari Atoll: Dec. 1957, Krauss. Ocean Island: Dec. 1957, Krauss.

DISTRIBUTION: Gilbert Is. (Tarawa, Butaritari), Ocean I.

This species is closely similar to the widespread *C. analis*, but differs in being generally smaller, and in that the fusion of *rs* and *m* in the forewing is always very short, or a point junction. Most of the specimens from Tarawa Atoll have the junction at a point, those from Butaritari Atoll are mixed, almost half having a point junction, half having a very short fusion.

31. *Caecilius trukensis* Thornton, Lee & Chui, n. sp. (fig. 9, *c*; 12, *g*)

FEMALE: Coloration (after *c.* 10 years dry storage). Head buff, eyes black. Two basal flagellar segments buff, apical segments brown. Thoracic terga brown, no median band visible. Pleura and legs pale buff. Forewing (fig. 9, *c*) with anal cell filled with brown fuscous pigment, brown cloudiness along distal part of basal section of *cu*, and to a lesser extent along apical two-thirds of boundary vein of areola postica, otherwise hyaline; veins *m*, *rs* and their apical branches brown, otherwise veins pale. Hindwing hyaline. Abdomen buff.

Morphology. I.O.: D. = 4.0: 1. Number of ctenidiobothria on basal hind tarsal segment: 18. Subgenital plate rounded posteriorly, lateral apophyses small but distinct. Glandular section of spermathecal duct short and wide. A field of 13 trichobothria on each paraproct.

Body length (after softening, in alcohol): 1.2 mm.

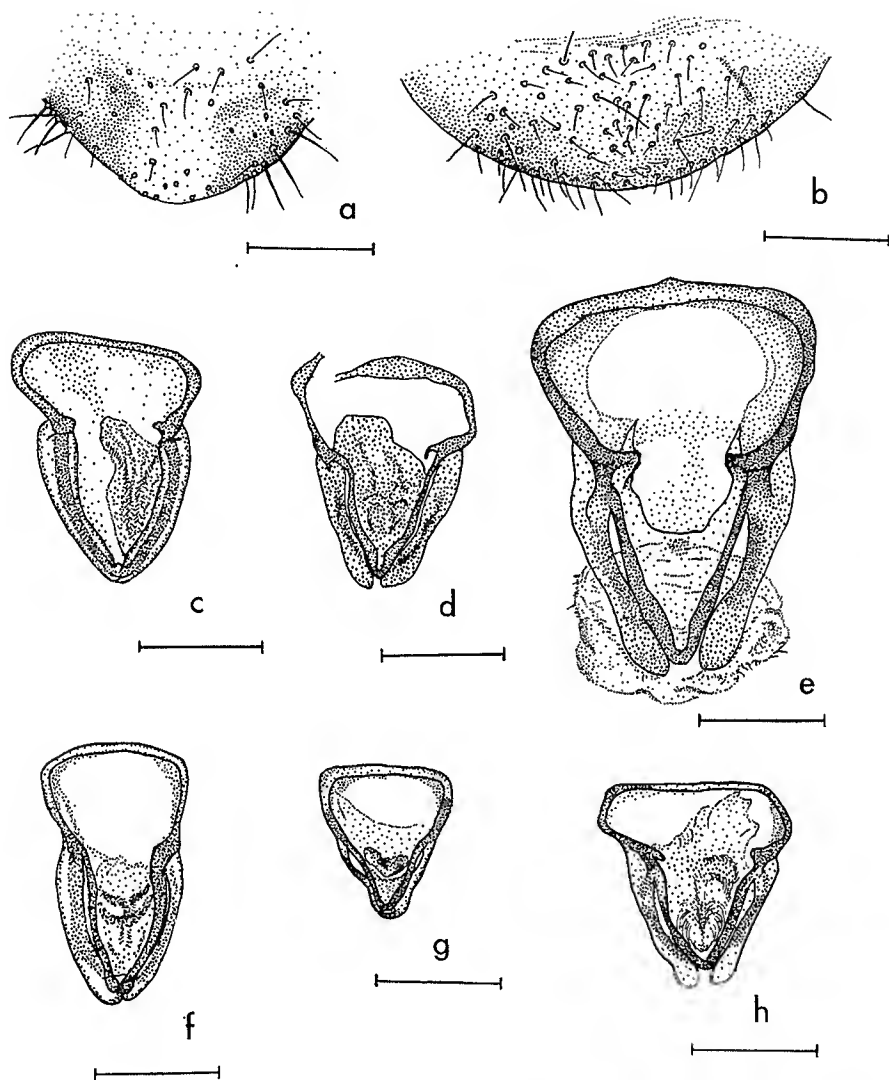


FIGURE 12.—Hypandrium: **a**, *Caecilius apicatus*; **b**, *C. pseudanalis*; penis frame: **c**, *C. apicatus*; **d**, *C. leuroceps*; **e**, *C. marginatus*; **f**, *C. marianus*; **g**, *C. trukensis*; **h**, *C. pseudanalis*. Scales = 0.1 mm.

MALE: Coloration (after *c.* 10 years storage in alcohol). As female, except flagellum dark brown, basal half of basal segment paling to brown; in forewing whole of basal section of *cu*₁ suffused with dark brown pigment, paler pigment cloud around apical two-thirds of *m* + *cu* and its connection to *rs* + *m*, connection of *r* to *rs* + *m* brown.

Morphology. I.O.: D. = 0.6: 1. Number of ctenidiobothria on basal hind tarsal segment: 9. Genitalia: hypandrium with groups of long setae on posterior margin placed extremely laterally, medially very short fine setae. Penis frame (fig. 12g) very angular basally,

without inner peg-like structures at base of parameres. Epiproct without papillar field of any kind, and no field of fine setae. Paraproct with a field of 17 trichobothria.

Body length (after softening in alcohol): 1.2 mm.

Holotype, ♀ (BISHOP 9529), Caroline Is., Truk, Tol I., Mt. Unibot, 25–39 m, under bark of dead *Artocarpus*, and “native forest”, Dec. 30, 1953–Jan. 2, 1954, Gressitt. Allotype, ♂ (BISHOP), same data. Paratypes, Truk: Tol I., Olej-Foup, Apr. 6, 1940, Yasumatsu; Moen I., 165 m, Jul. 31, 1946, Townes; Moen I., Mt. Teroken 70–80 m, Dec. 18, 1952, Feb. 1–6, 1953, Gressitt; Fefan I., Mt. Iron, 180 m, Jan. 31, 1953, Gressitt.

DISTRIBUTION: Caroline Is. (Truk).

This species resembles *Caecilius fuscipennis* from Yap and Palau, but is smaller, has relatively smaller eyes, and differs in forewing pattern, which in this species shows slight sexual dimorphism. It is apparently confined to Truk Atoll.

FAMILY PHILOTARSIDAE Pearman, 1936

CHARACTERISTICS: Venation complete, areola postica free, veins and wing margins setose, tarsi three-segmented; female subgenital plate with single apical lobe, gonapophyses complete.

KEY TO MICRONESIAN GENERA OF PHILOTARSIDAE

- Phallosome with penial sclerites; subgenital plate of female tapering to apex which has an apical medial insertion; lateral valve of female gonapophyses broadly triangular; forewing hairs sited on dark spots; antennal segments with white apices.....**Aaroniella**
 Phallosome without penial sclerites; female subgenital plate with strip-like apical process twice as long as wide; lateral valve of female gonapophyses oval; forewing hairs not sited on dark spots; antennal segments without white apices.....**Haplophallus**

Genus *Aaroniella* Mockford

Aaroniella Mockford, 1951, *Psyche Camb.*, Mass. **58** (3): 102. —Thornton, 1959, *Trans. R. Ent. Soc. Lond.* **111** (11): 337.

KEY TO MICRONESIAN SPECIES OF AARONIELLA

- Forewing with a wide band of pigment from pterostigma to areola postica, interrupted or continuous, more than half pterostigma covered with brown pigment; head with triangular patch of pigment over epicranial suture.....**32. gressitti**
 Forewing with a narrow, discontinuous series of brown patches from pterostigma to areola postica, pterostigma with pigment only around margin; pigmented bands either side of epicranial suture, suture itself without patch of pigment.....**33. trukensis**

32. *Aaroniella gressitti* Thornton, Lee & Chui, n. sp. (fig. 13, *a*; 14, *c*; 15, *a*; 16, *a, b*; 17, *a*)

FEMALE: Coloration (after c. 10 years alcohol storage). Head generally buff, usual vertex

markings reddish brown, arrow-shaped mark on epicranial suture. Clypeus with distinct brown parallel bands not extending to anterior margin. Genae pale, brown round antennal socket, broad brown band along lower border, narrower band along posterior border. Eyes black; ocelli pale, bordered black along inner margins. Antennae buff, flagellar segments ringed with white apically. Head pattern shown in fig. 17, a. Thorax dark brown. Legs wholly dark brown. Forewing (fig. 13, a) with a broken or continuous wide transverse brown band, no cloudiness in apical cells, pterostigma largely dark brown, large brown clouds in basal half of wing, two or three apical veins with small fuscous clouds apically, setae on veins sited on dark brown spots. Hindwing hyaline. Abdomen buff-brown, no visible transverse bands.

Morphology. I.O.: D. = 4.5: 1. Hind tarsal segments with 13; 1; 0 ctenidiobothria. Claws with pre-apical tooth, Pearman's organ complete. In hindwing *rs* setose almost to point of origin from *m*. Subgenital plate (fig. 15, a) setose over whole of disc, up to suture marking off sclerotized portion, apical sclerite not markedly wider basally. Gonapophyses (fig. 14, c) with outer valve roughly triangular. A field of 12–15 trichobothria on each paraproct.

Body length (in alcohol): 1.6 mm (average of 5 specimens, range 1.5–1.8 mm).

MALE: Coloration (after c. 10 years alcohol storage). As female.

Morphology. I.O.: D. = 3.8: 1. Hind tarsal segments with 13; 1; 0 ctenidiobothria. Claws and coxae as female. In hind wing *rs* bare for a distance from point of origin from *m*. Genitalia: hypandrium (fig. 16, a) slightly emarginate apically, conspicuously setose. Penis frame (fig. 16, b) small, radula not prominent. A round field of 17–21 trichobothria on each paraproct.

Body length (in alcohol): 1.4 mm (average of 5 specimens, range 1.3–1.5 mm).

Holotype, ♀ (BISHOP 9530), Caroline Is., Palau, Koror, Feb. 7, 1954, Beardsley. Allotype, ♂ (US), Palau, Koror, NE, limestone ridge, Apr. 27, 1957 Sabrosky. Paratypes, Palau: Koror: NE, limestone ridge, 40 m, Jul. 14, 1952, Gressitt; on *Glochidion* sp., Apr. 1954, Beardsley. Yap: Mt. Matade, 60 m, Dec. 2, 1952, Gressitt; Kolonia, Apr. 23, 1954, Beardsley. Ponape: Ag. Exp. Stn., Jun.–Sep. 1950. Kusaie: Mutunlik, beating, Aug. 16, 1963, Clarke.

DISTRIBUTION: Caroline Is. (Palau, Yap, Ponape, Kusaie).

This species differs from *A. pulchra* Thornton, and *A. maculosa* (Aaron), of which the male genitalia are known, as does the next, in lacking distinct internal phallic sclerites. It differs from *Aaroniella trukensis* in head pattern,

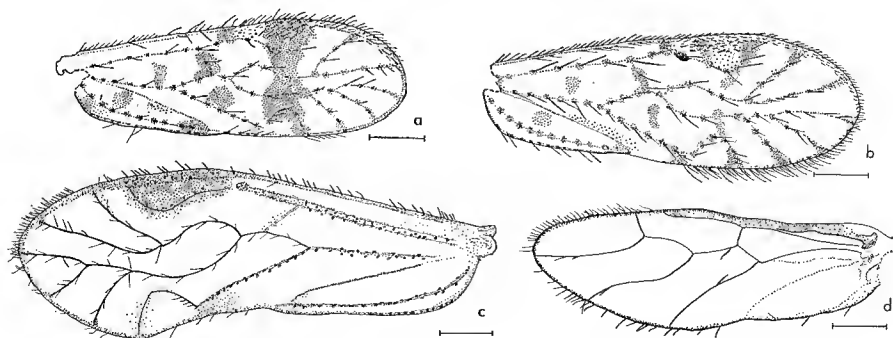


FIGURE 13.—Forewing: a, *Aaroniella gressitti*; b, *A. trukensis*; c, *Haplophallus boninensis*; hindwing: d, *H. boninensis*. Scales = 0.3 mm.

forewing pattern, subgenital plate, hypandrium and penis frame. It is also smaller, there being no overlap in forewing length between the two species. Nevertheless the species are clearly very closely related; both are similar to *Caecilius guttulatus* Banks, described from the Philippines, the genitalia of which are not described, but which clearly should not be placed in *Caecilius*.

The genus has a Pacific and circum-Pacific distribution.

33. *Aaroniella trukensis* Thornton, Lee & Chui, n. sp. (fig. 13, b; 14, d; 15, b; 16, c, d; 17, b)

FEMALE: Coloration (after c. 10 years dry storage). As *Aaroniella gressitti*, with the following exceptions: no arrow-shaped mark on epicranial suture (fig. 17, b), pigment lateral to suture merges into a single band, isolated spots lateral to these dark. Forewing (fig. 13, b) sometimes with vague spots in outer cells, often 4 veins with quite large fuscous clouds apically, transverse band narrow, always interrupted, pterostigma clear, with a few brown spots round margin, proximal spots small, discreet, Legs pale, tibia with wide dark band distally, narrower band near proximal end.

Morphology. I.O.: D. = 5.0: 1. Claws with preapical tooth, Pearman's organ complete. In hind wing *rs* bare for a distance from point of separation from *m*. Subgenital plate (fig. 15, b) setae end posteriorly in subdistal row some distance from sclerotized section of plate; apical sclerite wider basally. Gonapophyses (fig. 14, d). A field of 14–15 trichobothria on each paraproct. Body length (in alcohol): 1.7 mm (average of 4 specimens, range 1.6–1.8 mm).

MALE: Coloration (after c. 10 years dry storage). As female, except pigment in forewing rather more extensive, pterostigma often wholly dark, spots of transverse band quite large but band always interrupted.

Morphology. Claws with preapical tooth, Pearman's organ complete. Vein *rs* in hindwing bare for a distance from point of separation from *m*. Genitalia: hypandrium (fig. 16, d) distinctly emarginate posteriorly. Penis frame (fig. 16, c) with fairly distinct radula. A round field of 19 trichobothria on each paraproct. Male forewing usually rather shorter than female.

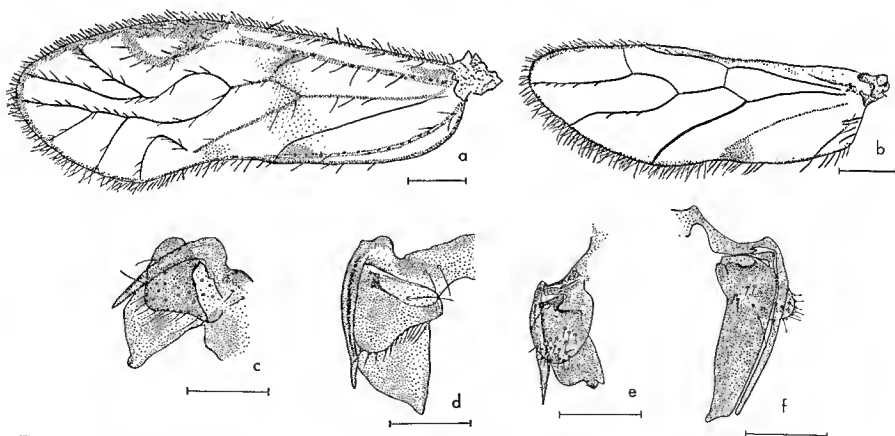


FIGURE 14.—*Haplophallus fuscistigma*: a, forewing; b, hindwing; female gonapophyses: c, *Aaroniella gressitti*; d, *A. trukensis*; e, *H. boninensis*; f, *H. fuscistigma*. Scales a–b = 0.3 mm; c–d = 0.1 mm; e–f = 0.2 mm.

Body length (in alcohol): 1.5 mm (average of 3 specimens, range 1.4–1.6 mm).

Holotype, ♀ (BISHOP 9531), Caroline Is., Truk, Tol I., Mt. Unibot, native forest, light trap, 32 m, Jan. 4, 1953, Gressitt. Allotype, ♂ (BISHOP), same data. Paratype, Truk: Tol I., Olei, Apr. 12, 1940, Yasumatsu and Yoshimura; Moen I., 180 m, Jul. 31, 1946, Townes; Mt. Unibot, native forest, Jan. 3, 1953, Gressitt.

DISTRIBUTION: Caroline Is. (Truk).

This species, which is apparently confined to Truk, is rather larger than *A. gressitti*, and differs in head pattern, forewing pattern, details of ciliation of subgenital plate and shape of apical apophyses, hypandrium, and penis frame.

Genus **Haplophallus** Thornton

Haplophallus Thornton, 1959, Trans R. Ent. Soc. Lond. **111** (11): 336.

KEY TO MICRONESIAN SPECIES OF HAPLOPHALLUS

- Pterostigma pigmented round margin with a distinct hyaline "window" within the cell;
dorsal valve of female gonapophyses more than twice as long as outer valve; subgenital
plate apical lobe about three times as long as broad.....**35. fuscistigma**
Pterostigma fairly evenly pigmented, without distinct hyaline "window"; dorsal valve
of female less than twice as long as outer valve; subgenital plate apical lobe about twice
as long as broad.....**34. boninensis**

34. Haplophallus boninensis Thornton, Lee & Chui, n. sp. (fig. 13, *c, d*; 14, *e*; 15, *d*; 16, *e, f*; 17, *c*)

FEMALE: Coloration (after *c.* 7 years dry storage). Head pattern as in fig. 17*c*, a cream band from gena around head across anterior part of clypeus. Eyes black. Antenna with basal two segments dark brown, flagellum brown. Maxillary palps brown, apical segment dark brown. Thoracic terga brown, margin cream, scutella paler. Pleura brown. Legs brown; femora marked with darker brown, anterior femur prominently banded, brown bands more extensive and merging in posterior legs; posterior tibia brown, a pale band sub-basally; tarsi dark brown. Forewing (fig. 13, *c*) similar to *H. fuscistigma*, but dark brown pigment in apical angle of second cubital and anal cells less extensive, no faint transverse band, pterostigma wholly brown. Hindwing (fig. 13, *d*) fuscous in costal cell and apical angle of cell *Cu*₂. Abdomen grey-brown dorsally and ventrally.

Morphology. I.O.: D. = 7.5: 1. Number of ctenidiobothria on basal hind tarsal segment: 15. Hindwing *rs* setose only along *r*₄₊₅. Pearman's organ complete. Subgenital plate (fig. 15, *d*) apical lobe rather abruptly truncate, with 8 apical setae; disc setose and with narrow sclerotized band along posterior margin. Gonapophyses (fig. 14, *e*): ventral valve narrow; dorsal valve appearing rectangular but bent on itself at right angles, a distinct conical lobe on posterior margin bearing short sharp setae, outer valve oval, almost as long as dorsal valve. A field of 17 trichobothria on each paraproct and two central setae not in rosette sockets.

Body length (in alcohol): 2.4 mm (average of 5 specimens, range 2.1–2.6 mm).

MALE: Coloration (after *c.* 7 years dry storage). As female.

Morphology. I.O.: D. = 4.0: 1. Flagellar setae over twice as long as those of female.

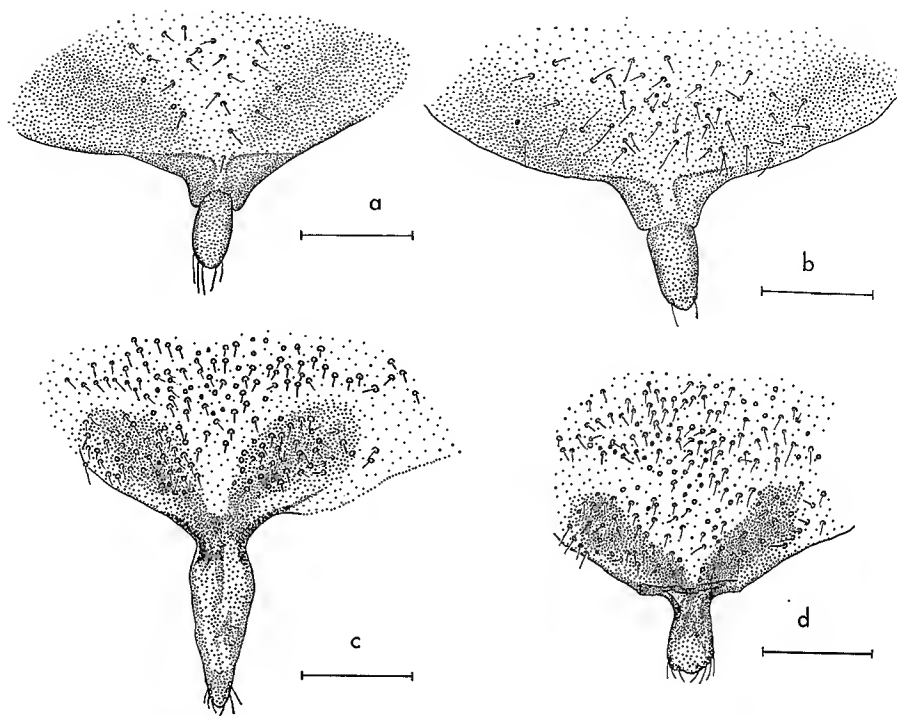


FIGURE 15.—Subgenital plate: **a**, *Aaroniella gressitti*; **b**, *A. trukensis*; **c**, *Haplophallus fuscistigma*; **d**, *H. boninensis*. Scales a-b = 0.1 mm; c-d = 0.2 mm.

Number of ctenidiobothria on basal hind tarsal segment: 17. Pearman's organ complete. Genitalia: hypandrium (fig. 16, f) as usual for the genus. Penis frame (fig. 16, e) normal. An oval field of 24 trichobothria and three additional setae (2 central, 1 marginal) not in rosette sockets on each paraproct.

Body length (in alcohol): 1.9 mm (average of 5 specimens, range 1.8–2.2 mm).

Holotype, ♀ (US 71411), Bonin Is., Chichi Jima, Omura, "Camp beach", Apr. 2–25, 1958, Snyder. Allotype, ♂ (US), same data. Paratypes, Ototo Jima: Kammuri-iwa, SW bay, Jun. 3, 1958, Snyder. Ani Jima: N. end, Jul. 11, 1949, Mead; Sen-zan, NE bay, May 28, 1958, Snyder. Chichi Jima: Aug. 26, 1951, R.M. Bohart; "Bull beach", Apr. 2, 1956, Clagg; Futamiko, May 10, 1956, Clagg; Chihiro-iwa, "Mulberry beach", May 11–22, 1958, Snyder; Yatuse R. (Minato ko), "General's beach", Apr. 10–22, 1958, Snyder; Miyanohama, "Jack Wm's beach", Apr. 15–21, 1958, Snyder; Yoake yama, Apr. 21, 1958, Snyder; Ogiura, Apr. 8, May 12, 1958, Snyder; Omura, "Camp beach", May 5, Jun. 9, 1958, Snyder; Sakai-ura, "Bull beach", May 12–31, 1958, Snyder; Okumura, "Yankee town", May 12, Jun. 9, 1958, Snyder; Miyanohama, "Jack Wm's beach", May 12, Jun. 9, 1958, Snyder. Haha

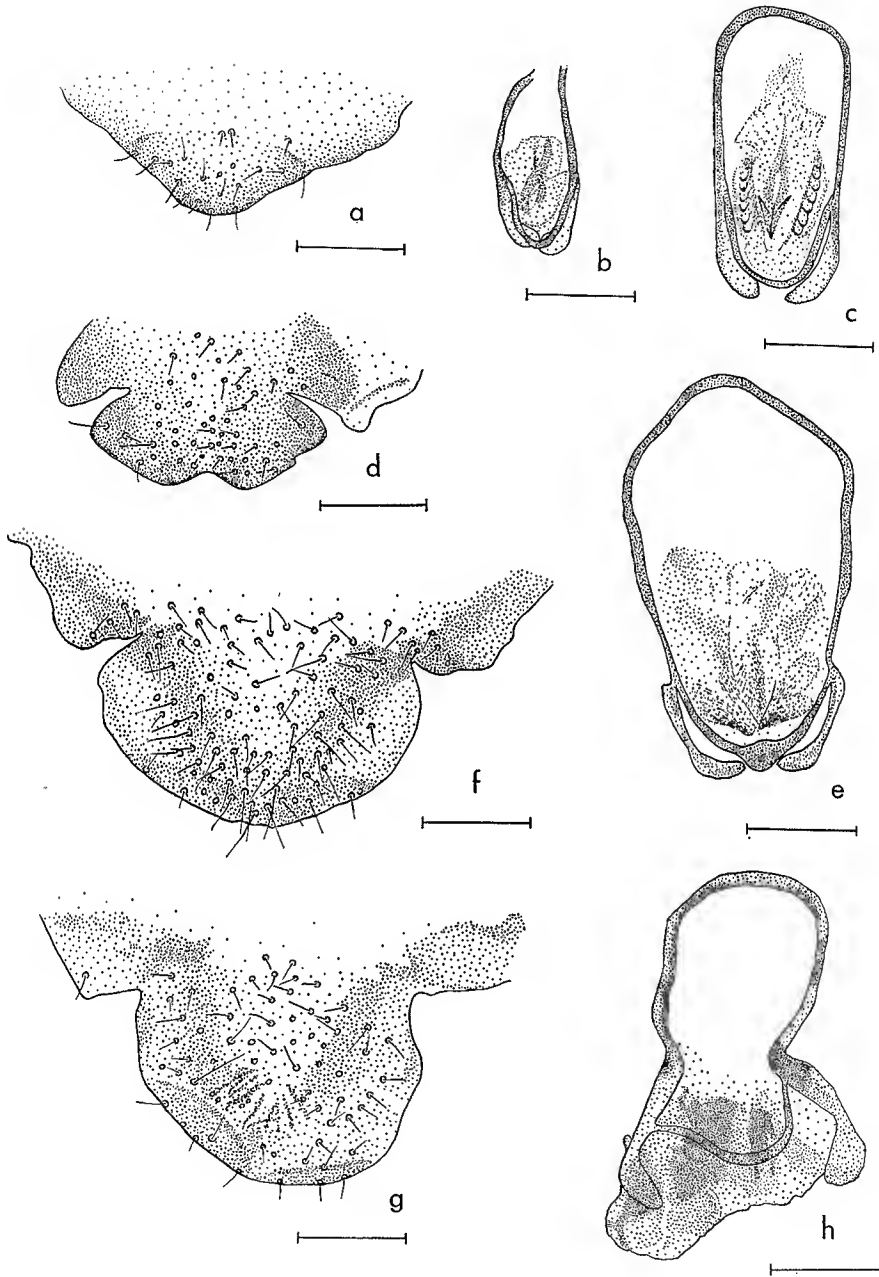


FIGURE 16.—*Aaroniella gressitti*: **a**, hypandrium; **b**, penis frame; *A. trukensis*: **c**, penis frame; **d**, hypandrium; *Haplophallus boninensis*: **e**, penis frame; **f**, hypandrium; *H. fuscistigma*: **g**, hypandrium; **h**, penis frame. Scales = 0.1 mm.

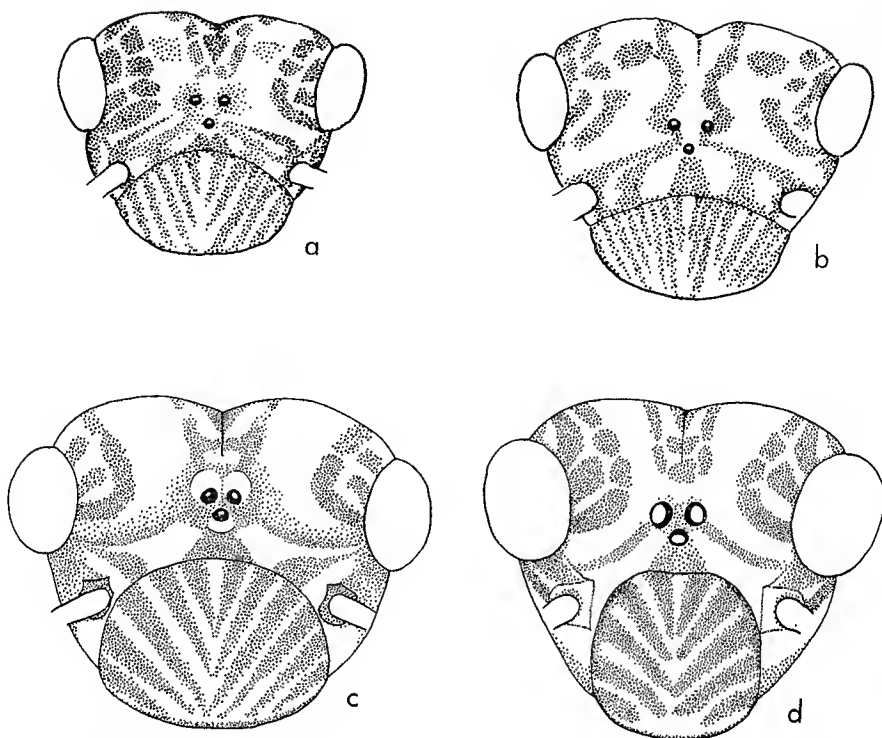


FIGURE 17.—Head pattern: **a**, *Aaroniella gressitti*; **b**, *A. trukensis*; **c**, *Haplophallus boninensis*; **d**, *H. fuscistigma*. Not to scale.

Jima: Okimura, Apr. 26, Jun. 9, 1958, Snyder. Hitomaru Jima: May 22, 1958, Snyder. Additional specimens, Iwo Jima: May 10, 1956, Clagg; May 11, 1956, sweeping, Clagg.

DISTRIBUTION: Bonin Is. (Ototo Jima, Ani Jima, Chichi Jima, Haha Jima, Hitomaru Jima), Volcano Is. (Iwo Jima).

This species, confined to the Bonin and Volcano Islands, may be distinguished from *H. fuscistigma* in the Marianas by the pterostigma pigmentation and head pattern, as well as by the female genitalia. Like *H. fuscistigma*, it is related to *H. orientalis* Thornton found on the Asian mainland.

35. *Haplophallus fuscistigma* Thornton, Lee & Chui, n. sp. (fig. 14, *a*, *b*, *f*; 15, *c*; 16, *g*, *h*; 17, *d*)

FEMALE: Coloration (after *c.* 20 years in alcohol). Distinct brown head markings as in figure 17, *d*. Antenna mid-brown, flagellar segments paler apically. Eyes black. Segments of maxillary palp brown basally, paler apically, except distal segment wholly dark brown. Thoracic terga brown, sutures prominently bordered cream, except scutella cream with very dark brown along anterior sutures; pleura brown. Legs: coxa and femur dark brown, trochanter

pale, tibia brown, darker narrow sub-basal and wide subapical band on tibia of pro- and meso-thoracic legs, tarsi brown. Forewing (fig. 14, a) with conspicuous dark brown pigmentation within pterostigma bordering a central hyaline area, stigmatasac and central hyaline area white by reflected light; veins brown, except cu_2 and cu_{1b} ; dark brown pigmentation at distal end of cell Cu_2 , fainter brown cloud at distal angle of first cubital cell, veins forming distal angle of basal radial cell bordered by diffuse brown pigment, this continuing as a fainter transverse band across wing. Hindwing (fig. 14, b) with faint brown pigmentation throughout costal cell and at distal angle of second cubital cell. Abdomen dorsally grey-brown except cream extremely basally and a cream transverse band anterior to apical sclerites; ventrally grey-brown.

Morphology. I.O.: D. = 7.5: 1. Number of ctenidiobothria on basal hind tarsal segment: 17. On rs in hindwing, setae on branch r_{4+5} only. Pearman's organ complete. Subgenital plate (fig. 15, c) with apical lobe long, spear-shaped, bearing six setae apically, sclerotized areas on disc widening basally, a narrow sclerotized band on each side close to posterior margin of main plate. Gonapophyses (fig. 14, f) ventral valve styliform; dorsal valve long, folded on itself at right angles, an ill-defined lobe on posterior margin; outer valve oval, much shorter than dorsal valve, evenly covered with long setae. A field of 26 trichobothria on each paraproct and two setae not in rosette sockets.

Body length (in alcohol): 2.2 mm (average of 5 specimens, range 2.1–2.2 mm).

MALE: Coloration (after c. 20 years alcohol storage). As female.

Morphology. Flagellar setae over three times as long as those of female. Number of ctenidiobothria on basal hind tarsal segment: 16. Pearman's organ complete. Genitalia: hypandrium (fig. 16, g) simple, evenly setose, a slight median notch posteriorly. Penis frame (fig. 16, h) complete ring, no median basal thickening, outer parameres with hyaline tubercles on apices. An oval field of 18 trichobothria on each paraproct, with additional setae (2 central, 1 marginal) without rosette sockets.

Body length (in alcohol): 1.7 mm (one specimen).

Holotype, ♀ (FM), Mariana Is., Saipan, Papago area, Jan. 17, 1945, Dybas. Allotype, ♂ (FM), same data. Paratypes, Saipan: Mt. Tagpochau, 380 m, Feb. 15–18, 1945, Dybas; Jun. 1951.

DISTRIBUTION: S. Mariana Is. (Saipan).

This species is closely similar in wing pattern to *H. fenestrastigma* (End.) (Seychelles) and *H. orientalis* Thornton (Hong Kong). It differs from both in head pattern and leg markings, and from *H. orientalis* in female genitalia.

FAMILY LACHESILLIDAE Badonnel, 1955

CHARACTERISTICS: Wings glabrous, venation complete; gonapophyses reduced; male abdominal apex complex; tarsi 2-segmented.

Genus *Lachesilla* Westwood

Lachesilla Westwood, 1840, Synopsis of the genera of British Insects: 47 (see note in Badonnel 1943, Faune Fr. 42: 102).

Pterodela Kolbe, 1880, Jbcr. Westf. ProvVer. Wiss. Kunst. 8: 118.

Leptopsocus Reuter, 1899, Act. Soc. Fauna Flora Fenn. 17 (3): 5.

Graphocaecilius Enderlein, 1900, Zool. Jb., Abt. Syst. 14: 155.

Terracaecilius Chapman, 1930, J. New York Ent. Soc. 38: 343.

36. *Lachesilla pedicularia* (L.)

Hemerobius pedicularius Linné, 1758, Systema Naturae: 551.

Hemerobius flavicans Linné, 1758, Systema Naturae: 551.

Termes fatidicum Linné, 1758, Systema Naturae: 610 (see Gurney, 1939, J. Wash. Acad. Sci. **29** (11)).

Hemerobius abdominalis Fabricius, 1775, Systema Entomologiae: 310.

Psocus nigricans Stephens, 1836, Illustrations of British Entomology Lond. 1827-46: 127.

Psocus binotatus Rambur, 1842, Histoire naturelle des insectes. Neuroptères: 324.

Leptopsocus exiguus Reuter, 1899, Act. Soc. Fauna Flora Fenn. **17** (3): 5.

Lachesilla pedicularia: Chapman, 1930, J. New York Ent. Soc. **38**: 354. —Badonnel, 1943, Faune Fr. **11**: 102. —Sommerman, 1946, Ann. Ent. Soc. Amer. **39** (4): 650.

See Enderlein 1915, Collections Zoologique du Baron Edm. de Selys-Longchamps **3**(2): 16-19 for a full synonymy.

DISTRIBUTION: Cosmopolitan.

S. MARIANA IS. SAIPAN: As Mahetog area, at light, May 1945, Dybas.

FAMILY ECTOPSOCIDAE Roesler, 1952

CHARACTERISTICS: 2 tarsal segments; forewing not much wider subapically, apex rounded, pterostigma subrectangular, areola postica lacking, *rs* and *m* joined by short fusion, point, or crossvein; in hindwing *rs* and *m* usually joined by long crossvein; female subgenital plate usually bilobed apically; gonapophyses sometimes with dorsal and ventral valves reduced or lacking; phallosome with dorsal and ventral sclerotized lamellae or tubular, radular sclerites asymmetrical; wings held rather flat at rest.

KEY TO MICRONESIAN GENERA OF ECTOPSOCIDAE

- Ninth tergite of male with transverse "comb" of sclerotized tubercles; female gonapophyses complete **Ectopsocus**
- Ninth tergite of male with complex sclerotized structures, possibly including a "comb", consisting of various apophyses and tubercles; female gonapophyses consisting of rudiments of outer valve only..... **Ectopsocopsis**

Genus **Ectopsocopsis** Badonnel

Ectopsocopsis Badonnel, 1955, Publ. Cult. Cia. Diamant Angola **26**: 185.

37. *Ectopsocopsis cryptomeriae* (Enderlein)

Ectopsocus cryptomeriae Enderlein, 1907, Stettin Ent. Ztg. **68**: 100 (*nec* Jentsch, 1939); 1908, Zool. Anz. **33**: 771. —Okamoto, 1910, Ann. Hist. Nat. Mus. Hung. **8**: 189. —Banks, 1937, Phillip. J. Sci. **62** (3): 267. —Takahashi, 1938, Mushi **11** (1): 13.

Ectopsocopsis cryptomeriae: Badonnel, 1955, Publ. Cult. Cia. Diamant Angola **26**: 185. —Thornton, 1962, Trans. R. Ent. Soc. Lond. **114** (9): 294; 1964, Pacific Ins. **6** (2): 288. —Mockford, 1965, Florida Ent. **48** (2): 115. —Thornton and Harrell, 1965, Pacific Ins. **7** (4): 701. —Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 26.

Ectopsocus pumilis: Chapman, 1930, J. New York Ent. Soc. **38**: 380 (*nec* Banks, 1920). —Ball, 1931, Mem. Soc. Ent. Belg. **23**: 188. —Sommerman, 1942, Ent. News **53**: 259; 1943, Psyche. Camb., Mass. **50**: 53. —Gurney, 1950, Pest Control Technology: 153. —Mockford, 1950, Proc. Ind. Acad. Sci. **60**: 199.

Ectopsocopsis pumilis: Badonnel, 1955, Publ. Cult. Cia. Diamant Angola **26**: 185. —Mockford and Gurney, 1956, J. Wash. Acad. Sci. **46**: 364. —Mockford, 1961, Florida Ent. **48** (2): 136.

Ectopsocus lepnevae Danks, 1955, Ent. Obozr. **34**: 181, 1960, Latv. Ent. **1**: 32.

Ectopsocopsis lepnevae: Thornton, 1962, Trans. R. Ent. Soc. Lond. **114** (9): 298.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian), Europe, Malaya, Hong Kong, Taiwan, Japan, North America, Hawaii.

S. MARIANA IS. SAIPAN: As Mahetog area, Jan. 1945; Obyan Point, May 1945; May 1945; all by Dybas. TINIAN: ridge 1 mile N. of Tinian Harbor, beating, Mar. 1945, Apr. 1945; NW slope Mt. Lasso, beating, Feb. 1945, Apr. 1945; ridge, SE section, Mar. 1945; Apr. 1945; all by Dybas.

Genus *Ectopsocus* McLachlan

Ectopsocus McLachlan, 1899, Ent. Mon. Mag. **35**: 277.

Micropsocus Enderlein, 1901, Zool. Jb., Abt. Syst. **14**: 546.

Chaetopsocus Pearman, 1929, Ent. Mon. Mag. **64**: 105.

Interpsocus Edwards, 1950, Pap. Roy. Soc. Tasm. **1949**: 126.

KEY TO MICRONESIAN SPECIES OF *ECTOPSOCUS*

(*E. waterstradti* End., 1901 keys to 9, but the genitalia are unknown and it cannot be keyed further. From the description (Enderlein, 1903) the ninth tergite of the male appears to be very similar to that of *E. maindroni*, and there is a possibility of synonymy).

1. Forewing with pattern of pigment.....2
Forewing hyaline, or of almost uniform coloration.....7
2. Forewing pattern consisting only of small pigmented spots at *rs-m* junction and apices of veins.....**38. briggsi**
Forewing pattern not as above, pigment more extensive.....3
3. Forewing with hyaline windows at margin of cells *R*₃ and *M*₁.....4
Forewing without hyaline windows at margins of cells *R*₃ and *M*₁.....**39. fullawayi**
4. Forewing with narrow hyaline borders to veins, hyaline areas otherwise absent in middle of wing.....5
Forewing without hyaline borders to veins, small hyaline windows near *rs-m* junction.....6
5. Forewing with a distinct darker spot over *rs-m* junction, pterostigma with an extensive hyaline window.....**52. spilotus**
Forewing pigmentation uniform apart from hyaline areas, pterostigma wholly and uniformly pigmented.....**46. marginatus**
6. Forewing with hyaline windows all small and of similar size, veins *rs* and *m* meeting at a point or united by a very short cross vein.....**51. speciosus**
Forewing with hyaline windows near *rs-m* junction much smaller than those in cells *Cu* and *M*₃, *rs* and *m* fused for a length.....**45. fenestratus**
7. In hindwing vein *r*₂₊₃ lacking.....**44. denervus**
Hindwing venation complete.....8
8. Forewing margin bare or setae microscopic, hindwing bare; subgenital plate distinctly bilobed9
Forewing margin with obvious long setae, hindwing margin setose between *r*₁ and *r*₄₊₅.....14

9. Each sub-lobe of subgenital plate with 4 setae.....10
Each sub-lobe of subgenital plate with 3 setae.....13
10. On each sub-lobe of subgenital plate, at least one seta is clearly posterior to the most mesial.....**47. ornatoides**
On each sub-lobe of subgenital plate, no seta is clearly posterior to the most mesial.....11
11. In forewing, origin of veins m_2 and m_3 faint or hyaline.....12
In forewing, origin of veins m_2 and m_3 as distinct as their distal portions.....**50. separatus**
12. Apical lobes of subgenital plate triangular, most mesial seta clearly the most posterior.....**48. paraplesius**
Apical lobes of subgenital plate rhomboidal, most mesial seta not clearly the most posterior.....**49. salpinx**
13. Each lobe of subgenital plate with one apical short stout seta and two lateral more slender setae; ninth tergite of male with a continuous posterior "comb" of sclerotized tubercles and a subapical rugose area each side; phallosome posteriorly with pair of thimble-shaped sclerites.....**41. pumilis**
Each lobe of subgenital plate with two apical long setae and one shorter more slender lateral seta; ninth tergite of male with two separate "combs" of close-packed sclerotized rods; phallosome posteriorly with tricorn median sclerite...**40. maindroni**
14. Apical lobe of subgenital plate with 8 setae.....**43. boharti**
Apical lobe of subgenital plate with 6 setae.....15
15. Ninth tergite of male with subapical band of small tubercles.....**53. thysanus**
Ninth tergite of male with apical row and median subapical group of small tubercles.....**54. villosus**

38. *Ectopsocus briggsi* McLachlan

Ectopsocus briggsi McLachlan, 1899, Ent. Mon. Mag. **35**: 277. —Jentsch, 1939, Zool. Jb., Abt. Syst. **73**: 119. —Badonnel, 1943, Faunc Fr. **42**: 99; 1944, Rev. Franc. Ent. **11**: 57. —Mockford, 1959, Proc. Ent. Soc. Wash. **61**: 261. —Thornton, 1964, Pacific Ins. **6** (2): 287. —Thornton and Harrell, 1965, Pacific Ins. **7** (4): 701. —Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 93.

Ectopsocus briggsi meridionalis Ribaga, 1904, Redia **1**: 294. —Badonnel, 1943, Faune Fr. **42**: 100.

DISTRIBUTION: Europe, Africa, Australia, New Zealand, North South and Central America, S. Mariana Is. (Saipan).

S. MARIANA IS. SAIPAN: May 1945, Dybas.

39. *Ectopsocus fullawayi* Enderlein

Ectopsocus fullawayi Enderlein, 1913, Zool. Anz. **41**: 356; 1920, Zool. Jb., Abt. Syst. **43**: 453. —Banks, 1931, Proc. Hawaii Ent. Soc. **7** (3): 438. —Zimmerman, 1948, Insects of Hawaii **2**: 234. —Swezey, 1954, Bernice P. Bishop Mus. Spec. Pub. **44**: 19. —Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 132.

DISTRIBUTION: Fiji, Samoa, Laysan, Hawaii, Tubuai, Rapa, Tuamotu archipelago, Pitcairn, Oeno, Henderson, Wake (Peale Island).

WAKE. PEALE: Sept. 1957, Krauss.

40. *Ectopsocus maindroni* Badonnel

Ectopsocus maindroni Badonnel, 1935, Rev. Franc. Ent. **2**: 81; 1946, Rev. Zool. Bot. Afr. **39** (2): 180; 1948, Rev. Zool. Bot. Afr. **40** (4): 316; 1949, Bull. Inst. Sci. Nat. Belg.

25 (11): 43; 1955, Publ. Cult. Cia. Diamant Angola 26: 185. —Ball, 1943, Bull. Mus. Hist. Nat. Belg. 19 (38): 6. —Thornton, 1962, Trans. R. Ent. Soc. Lond. 114 (9): 299; 1962, Pacific Ins. 4 (2): 453; 1964, Pacific Ins. 6 (2): 286. —Thornton and Wong, 1968, Pacific Ins. Monogr. 19: 73.

Ectopsocus cryptomeriae: Takahashi, 1938, Mushi 11 (1): 13. —Jentsch, 1939, Zool. Jb., Abt. Syst. 73: 125 (nec End., 1907).

DISTRIBUTION: Arabia, Africa, India, Malaya, Hong Kong, Philippines, Taiwan, Japan, Hawaii, Galapagos, N. and Central America, S. Mariana Is. (Saipan, Tinian), Caroline Is. (Palau, Kusaie), Marshall Is. (Ujae, Eniwetok), Gilbert Is. (Butaritari, Marakei).

S. MARIANA IS. SAIPAN: As Mahetog area, Jan. 1945, Sep. 1945; near Garapan, Jan. 1945; Mt. Tagpochau, 1 mile NNE of summit, on dry bird's skeleton, Jan. 1945; As Mahetog area, beating, Mar. 1945; all collected by Dybas; Jun. 1951, R.M. Bohart. TINIAN: NW slope Mt. Lasso, beating, Mar. 1945, Apr. 1945; beach cove, S. of Gurgan Point, Apr. 1945; all by Dybas.

PALAU. KOROR: in pan of formalin-preserved fish, Apr. 1957, Clagg.

KUSAIE. 1 m, Tafunsak, ex fruit, Mar. 1953, Clarke.

MARSHALL IS. UJAE: Bock I., flying. KWAJALEIN: Chuge I., ex mouldy books, Aug. 1944, Wallace; sweeping, Sep. 1956, Clagg. ENIWETOK: Japtan I., May 1946, Townes.

GILBERT IS. BUTARITARI: Dec. 1957, Krauss. MARAKEI: Dec. 1957, Krauss.

41. *Ectopsocus pumilis* (Banks)

Peripsocus pumilis Banks, 1920, Bull. Mus. Comp. Zool. Harv. 64: 313.

Ectopsocus pumilis: Mockford, 1965, Florida Ent. 48 (2): 113 (nec Chapman, 1930, J. New York Ent. Soc. 38. —Sommerman, 1943, Psyche Camb., Mass. 50). —Thornton and Wong, 1968, Pacific Ins. Monogr. 19: 14.

Ectopsocus ghesquierei Ball, 1943, Bull. Mus. Hist. Nat. Belg. 19 (38): 11. —Badonnel, 1946, Rev. Zool. Bot. Afr. 39 (2): 182. —Pearman, 1960, Entomologist 93: 249.

Ectopsocus ghesquierei: Thornton, 1962, Trans. R. Ent. Soc. Lond. 114 (9): 298.

DISTRIBUTION: Africa, India, Hong Kong, North America, S. Mariana Is. (Saipan).

S. MARIANA IS. SAIPAN: May 1945, Dybas.

42. *Ectopsocus waterstradti* (Enderlein)

Micropsocus waterstradti Enderlein, 1901, Zool. Jb., Abt. Syst. 14: 547. —Banks, 1942, Bull. Bishop Mus. 172: 28.

Ectopsocus waterstradti: Enderlein, 1907, Notes Leyden Mus. 29: 120.

DISTRIBUTION: Java, Borneo, New Guinea, Bismarck Archipelago, Guam.

This species was recorded from Guam by Banks.

43. *Ectopsocus boharti* Thornton and Wong

Ectopsocus boharti Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 94.

DISTRIBUTION: Bonin Is. (Chichi Jima).

BONIN IS. CHICHI JIMA: Jul. 1957, R.M. Bohart.

44. *Ectopsocus denervus* Thornton and Wong

Ectopsocus denervus Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 95.

DISTRIBUTION: Philippines, Samoa, S. Mariana Is. (Saipan, Guam), Caroline Is. (Palau, Yap, Truk, Ponape, Kusaie), Gilbert Is. (Butaritari).

S. MARIANA IS. SAIPAN: Achugan, Dec. 1944, Dybas; As Mahetog area, Jan. 1945, Dybas. GUAM: Amantes Point, beating, May 1945, Dybas.

PALAU. BABELTHUAP: Ngiwal, at light, May 1957; KOROR: 25 m, light trap, Dec. 1952, Gressitt.

YAP. YAP: Weloy Dugor, at light, Jun. 1957, Sabrosky; Gagil District, Jul. 1952, Goss.

TRUK. MOEN: Mt. Teroken, 80 m, light trap, Dec. 1952, Gressitt; Mt. Teroken, 30 m, light trap, Feb. 1953, Gressitt.

PONAPE. Colonia, 16 m, Ag. Exp. Stn., light trap, Jan. 1953, Apr. 1953, Gressitt.

KUSAIE. MUTUNLIK: Jan. 1953, Gressitt; Hill 1010, 300 m, light trap, Apr. 1953, Clarke; Malen R., 90 m, Apr. 1957, Clarke.

GILBERT IS. BUTARITARI: Dec. 1957, Krauss.

45. *Ectopsocus fenestratus* Thornton and Wong

Ectopsocus fenestratus Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 98.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian, Guam).

S. MARIANA IS. SAIPAN: Donni-Sados Tasi, May 1940, Yasumatsu and Yoshimura; As Mahetog area, Jan. 1945, Dybas; Papago area, Jan. 1945, Dybas; hills E. of Garapan, Jan. 1945, Dybas; Talofoto Ridge, Jan. 1945, Dybas; Chalan Laulau area, Jan. 1945, Dybas; Kalabera area, beating, Jan. 1945, Feb. 1945, Dybas; near Lake Susupe, Feb. 1945, Dybas; Apr. 1945, Dybas; Hangman Point area, Mar. 1945, Dybas; Kolder Field, Feb. 1958, Krauss. TINIAN: 1.5 miles NE of Tinian Harbor, Mar. 1945, Dybas; Tinian Harbor, Mar. 1945, Dybas; ridge, SE section, Mar. 1945, Dybas; NW slope Mt. Lasso, Apr. 1945, Dybas; ridge 1 mile N. of Tinian Harbor, sweeping base of *Pandanus*, Apr. 1945, Dybas; NE slope Mt. Lasso, Apr. 1945, Dybas. GUAM: Anderson Air Force Base, Aug. 1952, Krauss.

46. *Ectopsocus marginatus* Thornton and Wong

Ectopsocus marginatus Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 100.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian, Guam).

S. MARIANA IS. SAIPAN: Laulau Bay area, beating, Dec. 1944, Dybas;

Halaihai-As Teo area, beating, Feb. 1945, Dybas. TINIAN: NW slope Mt. Lasso, Mar. 1945, Apr. 1945, Dybas. GUAM: Pago, May 1945, G.E. Bohart; Yigo, Feb. 1958, Krauss.

47. *Ectopsocus ornatoides* Thornton and Wong

Ectopsocus ornatoides Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 103.

DISTRIBUTION: Bonin Is. (Chichi Jima), S. Mariana Is. (Saipan, Tinian), Caroline Is. (Palau, Truk, Ponape, Kusaie), Marshall Is. (Jaluit, Jemo), Fiji, Samoa, Hawaii.

BONIN IS. CHICHI JIMA: Jul. 1951, R.M. Bohart.

S. MARIANA IS. SAIPAN: As Mahetog area, beating, Dec. 1944, Jan. 1945, Feb. 1945, at light, May 1945, Dybas; Laulau Bay area, beating, Dec. 1944, Jan. 1945; near Garapan, Dec. 1944, Dybas; hills E. of Garapan, beating, Jan. 1945; Talofoto ridge, sweeping in open country, Jan. 1945; Chalan Laulau area, Jan. 1945; Kalabera area, beating, Jan. 1945, Feb. 1945; Halaihai-As Teo area, Feb. 1945; Sadog Talofoto, Talofoto area, beating, Feb. 1945; Mt. Tagpochau, 350 m, Feb. 1945; Hangman Point area, Mar. 1945; Apr. 1945, May 1945; all by Dybas. TINIAN: NW slope Mt. Lasso, Apr. 1945, Dybas; NE slope Mt. Lasso, Apr. 1945, Dybas.

PALAU. PELELIU: N. end, Aug. 1945, Hagen. BABELTHUAP: Ngerche-long, at light, May 1957, Sabrosky. KOROR: Jun. 1953, Beardsley.

TRUK. MOEN: Civ. Ad. Area, at light, Mar. 1949, Potts.

PONAPE. SE Nanponmal, Berlese, Jan. 1953, Gressitt.

KUSAIE. Tafunsak, 1 m, *ex* fruit, Mar. 1953, Clarke; Lele I., 1 m, beating, Mar. 1953, Clarke.

MARSHALL IS. JALUIT: Jabor I., on *Erythrina*, Apr. 1958, May 1958, Gressitt. JEMO: sweeping, Fosberg.

48. *Ectopsocus paraplesius* Thornton and Wong

Ectopsocus paraplesius Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 106.

DISTRIBUTION: Caroline Is. (Truk).

TRUK. Tol: Mt. Unibot, 300 m, Feb. 1953, Gressitt.

49. *Ectopsocus salpinx* Thornton and Wong

Ectopsocus salpinx Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 70.

DISTRIBUTION: Malaya, Palawan, Luzon, S. Mariana Is. (Guam).

S. MARIANA IS. GUAM: Mt. Lamlam, Oct. 1957, Feb. 1958, Dec. 1958, Krauss.

50. *Ectopsocus separatus* Thornton and Wong

Ectopsocus separatus Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 107.

DISTRIBUTION: Caroline Is. (Kusaie).

KUSAIE. Malem R., 90 m, Apr. 1953, Clarke.

51. *Ectopsocus speciosus* Thornton and Wong*Ectopsocus speciosus* Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 87.

DISTRIBUTION: New Guinea, Caroline Is. (Palau), Philippines.

PALAU. Babelthuap: Ngiwal, May 1957, Sabrosky.

52. *Ectopsocus spilotus* Thornton and Wong*Ectopsocus spilotus* Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 107.

DISTRIBUTION: Fiji, Samoa, Hawaii, Marshall Is. (Arno), Gilbert Is. (Tarawa).

MARSHALL IS. ARNO: Majuro, Apr. 1950, La Rivers; Majuro, Jun. 1950, Usinger.

GILBERT IS. TARAWA: Betio I., Nov. 1957, Dec. 1957, Krauss.

53. *Ectopsocus thysanus* Thornton and Wong*Ectopsocus thysanus* Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 110.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian, Guam).

S. MARIANA IS. SAIPAN: Laulau Bay, Tuturam, beating, Jan. 1945; Kalabera area, beating, Jan. 1945, Feb. 1945; Halaihai-As Teo area, Feb. 1945; Sadog Talofoto, Talofoto area, beating, May 1945; near Garapan, MLN, beating, Mar. 1945; all by Dybas. TINIAN: NW slope Mt. Lasso, Feb. 1945–Apr. 1945; ridge, SE section, Mar. 1945; NE slope Mt. Lasso, Apr. 1945; all by Dybas. GUAM: Yigo, Feb. 1958, Krauss; Ritidian Point, on fern, Apr. 1936, Bryan.

54. *Ectopsocus villosus* Thornton and Wong*Ectopsocus villosus* Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 112.

DISTRIBUTION: Caroline Is. (Truk, Ponape, Kusaie), Marshall Is. (Jaluit).

TRUK. MOEN: Mt. Teroken, Dec. 1952, Gressitt; FFEFAN: Mt. Iron, 150 m, Jan. 1953, Gressitt; TOL: Mt. Unibot, 39 m, Feb. 1953, Gressitt.

PONAPE. Ag. Exp. Stn., Jun.–Sep. 1953, Adams; Colonia, Jan. 1953, Clarke.

KUSAIE. Tafunsak, 1 m, *ex* fruit, Mar. 1953, Clarke; Lele I., 1 m, beating, Mar. 1953, Apr. 1953, Clarke; 165 m, beating, Mar. 1953, Clarke; Mutunlik, attracted to drying *Cyathea* leaves, Apr. 1953, Clarke; Malem R., 90 m, Apr. 1953, Clarke.

MARSHALL IS. JALUIT: Jabor I., May 1958, Gressitt; Majetto I., Apr. 1953, Gressitt.

FAMILY PERIPSOCIDAE Pearman, 1936

CHARACTERISTICS: 2 tarsal segments; forewing considerably wider subapically, apex tapering, pterostigma wider subapically, areola postica lacking, *rs* and *m* joined by fairly

long fusion; in hindwing *rs* and *m* joined by fusion; female subgenital plate usually with single apical lobe; gonapophyses complete; phallosome frame-like, usually 3 symmetrical radula sclerites; wings held roof-wise at rest.

Genus **Peripsocus** Hagen

Peripsocus Hagen, 1866, Verh. Zool.-Bot. Ges. Wien. **16**: 203.

Peripsocopsis Tillyard, 1923, Trans. N.Z. Inst. **54**: 193.

KEY TO MICRONESIAN SPECIES OF PERIPSOCUS

1. In forewing, pterostigma with large, reddish-brown spot in apical third, veins at *rs-m* junction faint, in hyaline area.....**55. ferrugineus**
In forewing, pterostigma not as above, veins at *rs-m* junction normal.....2
2. Forewing veins generally bordered with brown pigment, pterostigma pigment not peculiar, pigment on apical margin no darker than in some other areas...**56. pauliani**
Forewing without pigment along veins, pterostigma fairly uniformly reddish-brown, apical margin of wing darker than rest of membrane.....**57. suffitus**

55. Peripsocus ferrugineus Thornton and Wong

Peripsocus ferrugineus Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 91.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian, Guam), Caroline Is. (Tobi, Yap, Woleai, Ifalik, Truk, Ponape, Kusaie, Kapingamarangi), Fiji, Samoa, Hawaii.

S. MARIANA IS. SAIPAN: Laulau Bay area, Nov. 1944, Dec. 1944; As Mahetog area, Dec. 1944, Jan. 1945; Achugan, Oct. 1944; Halaihai-As Teo area, Jan. 1945, Feb. 1945; Mt. Tagpochau, 1 mile NNE of summit, beating, Jan. 1945, 300 m, Feb. 1945; Papago area, beating, Jan. 1945; all by Dybas. Also Jun. 1951, R.M. Bohart. TINIAN: beach cove off Gurgan Point, Mar. 1945, Dybas. GUAM: Mt. Lamlam, Oct. 1952, Feb. 1958, Krauss; Alifan, Apr. 1946, Krauss; Tutujan, Nov. 1952, Gressitt.

YAP. Yap, Oct. 1952; Yap Hill behind Yaptown, 60 m, Nov. 1952, Gressitt; Mt. Matade, 60 m, Dec. 1952, Gressitt.

CAROLINE ATOLLS. TOBI: Sep. 1952, Krauss. WOLEAI: Utagal I., Sep. 1952, Krauss. IFALIK: Ifalik I., Sep. 1952, Krauss. KAPINGAMARANGI: Matiro, Aug. 1946, Townes.

TRUK. FEFAN: Mt. Iron, 180 m, Jan. 1953, Gressitt.

PONAPE. Jul. 1950, Adams; Jokaj I., 2 m, Jan. 1953, Gressitt.

KUSAIE. Mutunlik, Aug. 1953, Clarke.

56. Peripsocus pauliani Badonnel

Peripsocus pauliani Badonnel, 1949, Rev. Franc. Ent. **16**: 42. —Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 20.

DISTRIBUTION: Africa, Malaya, Hong Kong, Philippines, Galapagos, Volcano Is. (Iwo Jima), S. Mariana Is. (Saipan, Tinian), Caroline Is. (Palau,

Yap), Marshall Is. (Kwajalein).

VOLCANO IS. Iwo JIMA: sweeping, May 1958, Snyder.

S. MARIANA IS. SAIPAN: Laulau Bay area, beating, Dec. 1944; Achugan, Dec. 1944; near Garapan, Dec. 1944, Jan. 1945, Mar. 1945; As Mahetog area, Jan. 1945; hills E. of Garapan, beating, Jan. 1945; Mt. Tagpochau, 300 m, Feb. 1945; Kalabera area, Feb. 1945; Obyan Point, May 1945; all collected by Dybas. TINIAN: ridge, SE section, Mar. 1945; NW slope Mt. Lasso, Apr. 1945; Lake Hagoi, beating, Apr. 1945; all by Dybas.

PALAU. BABELTHUAP: Melekei, at light, May 1957, Clagg.

YAP. Colonia, Jun. 1950, Goss; Gagil district, Jul.-Aug. 1950, Goss.

MARSHALL IS. KWAJALEIN: light trap, Sep. 1956, Clagg.

57. *Peripsocus suffitus* Enderlein

Peripsocus suffitus Enderlein, 1903, Ann. Hist. Nat. Mus. Hung. **1**: 293. —Banks, 1942, Bull. Bishop Mus. **172**: 27. —Thornton and Wong, 1968, Pacific Ins. Monogr. **19**: 76.

DISTRIBUTION: New Guinea, Guam.

This species was reported from Guam by Banks (1942). The record is regarded as questionable.

FAMILY HEMIPSOCIDAE Pearman, 1936

CHARACTERISTICS: In forewing *m* 2-branched, areola postica joined to *m* by cross-vein, tarsi 2-segmented.

Genus *Hemipsocus* Selys-Longchamps

Hemipsocus Selys-Longchamps, 1879, C.R. Soc. Ent. Belge **22**: 146.

KEY TO MICRONESIAN SPECIES OF HEMIPSOCUS

Forewing with setae of veins sited on dark spots.....59. *roseus*
Forewing without dark spots on veins.....58. *chloroticus*

58. *Hemipsocus chloroticus* (Hagen)

Psocus chloroticus Hagen, 1858, Verh. Zool.-Bot. Ges. Wien. **8**: 474; 1859, Verh. Zool.-Bot. Ges. Wien. **9**: 200; 1866, Verh. Zool.-Bot. Ges. Wien. **16**: 212. —McLachlan, 1872, Ent. Mon. Mag. **9**: 77.

Hemipsocus chloroticus: Selys-Longchamps, 1872, Ent. Mon. Mag. **9**: 145 (*nec* Enderlein, 1903, Ann. Hist. Nat. Mus. Hung. **1**: 234; 1908, Zool. Anz. **33**: 767. —Sochardjan and Hamann, 1959, Idea **12** (1): 9). —Enderlein, 1915, Collections Zoologique du Baron Edm. de Selys-Longchamps **3** (2): 39; 1926, Zool. Meded. **9**: 53. —Karny, 1932, Insects of Samoa **7** (4): 125. —Banks, 1937, Philipp. J. Sci. **69** (2): 260. —Tsutsumi, 1964, Kontyû **32** (1): 118.

Hemipsocus chloroticus var. *stenostigmus* Banks, 1942, Bull. Bishop Mus. **172**: 25 (*nec* *H. chloroticus* var. *luridus* Enderlein, 1903, Ann. Hist. Nat. Mus. Hung. **1**: 235. —Sochardjan, 1958, Idea **11**: 30).

Hemipsocus hyalinus Enderlein, 1906, Stettin. Ent. Ztg. **67**: 311. —Okamoto, 1907, Trans.

Sapporo Nat. Hist. Soc. **2**: 135. —Karny, 1925, Sarawak Mus. J. **3** (8): 65.

DISTRIBUTION: Ceylon, Vietnam, Java, Borneo, Philippines, Taiwan, Japan, Amami Is., Hawaii, S. Mariana Is. (Guam), Caroline Is. (Yap, Ulithi, Truk, Kusaie), Marshall Is. (Arno).

S. MARIANA IS. GUAM: Ylig Bay, Dec. 1958, Krauss.

YAP. MAP: coconut palm, Jul.–Aug. 1950, Goss; YAP: Oct. 1952, Krauss; Mt. Matade, 60 m, Dec. 1952, Gressitt.

CAROLINE ATOLLS. ULITHI: Falalop I., Oct. 1952, Krauss.

TRUK. MOEN: Mt. Tonaachau, S. valley, Apr. 1949, Potts.

KUSAIE. Malem R., 90 m, beating, Mar. 1953, Clarke.

MARSHALL IS. ARNO: Ine I., Aug. 1950, La Rivers.

59. *Hemipsocus roseus* (Hagen)

Psocus roseus Hagen, 1859, Verh. Zool. Bot. Ges. Wien. **9**: 203.

Epipsocus roseus: McLachlan, 1872, Ent. Mon. Mag. **9**: 78. —Enderlein, 1903, Ann. Hist. Nat. Mus. Hung. **1**: 256.

Hemipsocus roseus: Banks, 1931, Proc. Hawaii Ent. Soc. **7** (3): 438; 1939, Philipp. J. Sci. **69** (2): 136. —Williams, 1931, Proc. Hawaii Ent. Soc. **7** (3): 373, 510. —Sakimura and Linford, 1940, Proc. Hawaii Ent. Soc. **10** (3): 451. —Zimmerman, 1948, Insects of Hawaii **2**: 236. —Kuwayama, 1961, Nature & Life in S.E. Asia **1**: 203. —Thornton, 1964, Pacific Ins. **6** (2): 287.

DISTRIBUTION: Ceylon, Thailand, Philippines, Hawaii, Central America, West Indies, Caroline Is. (Palau).

PALAU. BABELTHUAP: Ngarard, Aug. 1939, Esaki; E. Nagatpang, 65 m, Dec. 1952, Gressitt; Ngiwal, at light, May 1957; Melekeiok, at light, May 1957. KOROR: Sep. 1952, Krauss; SW, 25 m, light trap, Dec. 1952, Gressitt; NE, 40 m, limestone ridge, Dec. 1952, Gressitt; light trap, Jan. 1953, Feb. 1953, May 1953; scale-infested coconut leaves, Aug. 1953, Beardsley; sweeping, Mar. 1954, Beardsley. PELELIU: Amiangal Mt., Dec. 1952, Gressitt.

PONAPE. SE Nanponmal, at light, 70 m, Jan. 1953, Gressitt.

This is the same species as that occurring in Hawaii, and may be synonymous with *H. selysianus* End., which is recorded from Singapore, Sumatra, Java, Taiwan and Samoa. We have also examined specimens of spotted winged *Hemipsocus* which are apparently of this species from Vietnam and New Guinea. It has been trapped in ships' aerial nets on two occasions near the Philippines.

FAMILY PSEUDOCAECILIIDAE Pearman, 1936

CHARACTERISTICS: Forewing venation as *Caecilius*, sometimes with median vein but 2-branched, pterostigma long and flat, areola postica flat, veins and margin with long setae, setae sometimes also on membrane; gonapophyses complete, dorsal and ventral valves often lobed; tarsi 2-segmented.

KEY TO MICRONESIAN GENERA OF PSEUDOCAECILIIDAE

1. In forewing, median vein 3-branched.....2
In forewing, median vein 2-branched.....**Pseudoscottiella**
2. Apices of veins of forewing with cloudy pigment, r_s stalk less than half length of r_{4+5}**Lobocaecilius**
Apices of veins of forewing without cloudy pigment; r_s stalk at least as long as r_{4+5}3
3. Dorsal and ventral valves of female gonapophyses each with distinct lobe and style, radula of penis with rod-like sclerites.....**Heterocaecilius**
Ventral valve always without lobe, dorsal valve without lobe or with indistinct lobe; males unknown.....**Pseudocaecilius**

Genus **Heterocaecilius** Lee and Thornton

Heterocaecilius Lee and Thornton, 1967, Pacific Ins. Monogr. 16: 13.

KEY TO MICRONESIAN SPECIES OF HETEROCAECILIUS

1. Forewing membrane hyaline.....2
Forewing membrane with some brown pigmentation and vague hyaline areas.....3
2. Forewing veins darker distally, areola postica shallow; posterior margin of ninth tergite of male with a pair of tubercular fields.....**62. campanula**
Forewing veins no darker distally, areola postica rather high; posterior margin of ninth tergite of male with a continuous row of tooth-shaped projections and a central field of spinelets.....**63. dybasi**
3. In forewing, proximal half of areola postica hyaline, posterior border of pterostigma without distinct brown border; lobes of female subgenital plate sharply pointed, narrow.....**60. adamsi**
In forewing, areola postica uniformly pigmented light brown, posterior border of pterostigma with distinct brown border; lobes of female subgenital plate bluntly pointed, very broad and shallow.....**61. minotus**

60. Heterocaecilius adamsi Lee and Thornton

Heterocaecilius adamsi Lee and Thornton, 1967, Pacific Ins. Monogr. 16: 59.

DISTRIBUTION: Caroline Is. (Ponape).

PONAPE. Mt. Tamatamansakir, 424 m, Jun.–Sep. 1950, Adams; 363–606 m, Aug. 1946, Townes; Mt. Beirut, Jun.–Sep. 1950, Adams.

61. Heterocaecilius minotus Lee and Thornton

Heterocaecilius minotus Lee and Thornton, 1967, Pacific Ins. Monogr. 16: 59.

DISTRIBUTION: Caroline Is. (Palau, Truk, Ponape, Kusaie), Marshall Is. (Ebon).

PALAU. PELELIU: Dec. 1952, Gressitt; Jul. 1945, Hagen. AULUPTAGEL: sweeping, Feb. 1952, Beardsley; 25 m, Dec. 1952, Gressitt. BABELTHUAP: at light, Sep. 1952, Beardsley; at light, May 1957. KOROR: Sep. 1952, Krauss; SW, 25 m, light trap, Dec. 1952, Gressitt.

TRUK. Tol: 390 m, Dec. 1952, Jan. 1953, Gressitt.

PONAPE. Jan. 1953, Gressitt; Sep. 1950, Adams; Mt. Tamatamansakir, 180 m, Jan. 1953, Gressitt.

KUSAIE. Mutunlik, Jan. 1953, Gressitt; Mt. Matante, 580 m, beating, Mar. 1953, Clarke.

MARSHALL IS. EBON: Sep. 1953.

62. *Heterocaecilius campanula* Lee and Thornton

Heterocaecilius campanula Lee and Thornton, 1967, Pacific Ins. Monogr. 16: 63.

DISTRIBUTION: Caroline Is. (Ponape, Kapingamarangi), Marshall Is. (Majuro), Gilbert Is. (Butaritari, Tarawa).

PONAPE. light trap, Jan. 1953, Gressitt.

CAROLINE ATOLLS. KAPINGAMARANGI: Aug. 1946, Townes.

MARSHALL IS. MAJURO: Aug. 1946, Townes.

GILBERT IS. BUTARITARI: Dec. 1957, Krauss. TARAWA: Teaoraereke, Dec. 1957, Krauss; Bairiki I., Dec. 1957, Krauss.

63. *Heterocaecilius dybasi* Lee and Thornton

Heterocaecilius dybasi Lee and Thornton, 1967, Pacific Ins. Monogr. 16: 67.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian), Gilbert Is. (Butaritari).

S. MARIANA IS. SAIPAN: beating vegetation, Jan. 1945, Dybas. TINIAN: NW slope, Mt. Lasso, Apr. 1945, Dybas.

GILBERT IS. BUTARITARI: Dec. 1957, Krauss.

Genus ***Lobocaecilius*** Lee and Thornton

Lobocaecilius Lee and Thornton, 1967, Pacific Ins. Monogr. 16: 12.

KEY TO MICRONESIAN SPECIES OF *LOBOCAECILIUS*

In forewing, pigment over extremities of veins diffuse, vein *r* of male without papillae; 4 apical lobes of female subgenital plate distinct.....**64. cynara**

In forewing, pigment over extremities of veins not diffuse, vein *r* of male with papillae; apical lobes of subgenital plate low, not clearly divided into 4.....**65. fennecus**

64. *Lobocaecilius cynara* Lee and Thornton

Lobocaecilius cynara Lee and Thornton, 1967, Pacific Ins. Monogr. 16: 70.

DISTRIBUTION: Caroline Is. (Palau).

PALAU. BABELTHUAP: Dec. 1952, Gressitt; Jul. 1946, Townes; Dec. 1952, Gressitt; May 1957, Sabrosky; Melekejok, May 1957, Sabrosky; Ngerehelong, May 1957, Sabrosky; Airai, Negerimal R., May 1957, Sabrosky. KOROR: Sep. 1952, Krauss; Apr. 1957, Sabrosky.

65. *Lobocaecilius fennecus* Lee and Thornton

Lobocaecilius fennecus Lee and Thornton, 1967, Pacific Ins. Monogr. 16: 74.

DISTRIBUTION: N. Mariana Is. (Anatahan), S. Mariana Is. (Saipan, Tinian, Guam), Caroline Is. (Tobi, Merir, Palau, Ngulu, Yap, Ulithi, Sorol, Woleai, Faraulep, Ifalik, Tasatawan, Ponape).

N. MARIANA IS. ANATAHAN: Aug. 1951, R.M. Bohart.

S. MARIANA IS. SAIPAN: Papago area, beating, Jan. 1945, Dybas; near Garapan, Jan. 1945, Dybas; Talofoto, beating, Feb. 1945, Dybas; Lam-lam Bay, Dec. 1944, Dybas; hills E. of Garapan, Jan. 1945, Dybas. TINIAN: Mar. 1945, Dybas; NW slope Mt. Lasso, Mar. 1945, Apr. 1945, Dybas; beach cove, Apr. 1945, Dybas; North Gurgan Point, Apr. 1945, Dybas; Marpo Valley, Oct. 1945, Dybas. GUAM: Potts Junction, Oct. 1952, Krauss; Sumay, on *Heritiera*, Jul. 1936, Swezey; Mt. Laulau, Oct. 1952, Krauss; Yigo, Dec. 1958, Krauss.

PALAU. KOROR: Oct. 1952; Mar. 1952, Gressitt; sweeping, Mar. 1954, Beardsley; Apr. 1957, Sabrosky.

YAP. Nov. 1952, Gressitt.

CAROLINE ATOLLS. TOBI: Sep. 1952, Krauss. MERIR: Sep. 1952, Krauss. NGULU: Oct. 1952, Krauss. ULITHI: Oct. 1952, Krauss. SOROL: Oct. 1952, Krauss. WOLEAI: Sep. 1952, Krauss. FARAULEP: Sep. 1952, Krauss. IFALIK: Sep. 1952, Krauss; Aug. 1953, Bohart. SATAWAN: Sep. 1952, Beardsley.

PONAPE. Jan. 1938, Esaki; Jun.-Sep. 1950, Adams.

Genus *Pseudocaecilius* Enderlein

Pseudocaecilius Enderlein, 1903, Ann. Hist. Nat. Mus. Hung. **1**: 260. —Pearman, 1936, Proc. R. Ent. Soc. Lond. (B) **5**: 60. —Roesler, 1940, Arb. Morph. Taxon. Ent. Berl. **7** (3): 243. —Lee and Thornton, 1967, Pacific Ins. Monogr. **16**: 2, 9.

KEY TO MICRONESIAN SPECIES OF *PSEUDOCAECILIUS*

1. Forewing uniformly greyish hyaline.....**67. marshalli**
Forewing with cloudy pigmented band across areola postica to media and across apical half of pterostigma.....2
2. Mesial borders of apical sublobes of subgenital plate about half length of apical setae, sublobes well developed, tapering distally.....**66. criniger**
Mesial borders of apical sublobes of subgenital plate less than a quarter length of apical setae, sublobes very short and little wider than setal bosses.....**68. tahitiensis**

66. *Pseudocaecilius criniger* (Perkins)

Elipsocus criniger Perkins, 1899, Fauna Hawaiiensis **2** (2): 85.

Kilauella criniger: Enderlein, 1913, Zool. Anz. **41**: 357; 1920, Zool. Jb., Abt. Syst. **43**: 456.—Zimmerman, 1948, Insects of Hawaii **2**: 239.

Pseudocaecilius elutus Enderlein, 1903, Ann. Hist. Nat. Mus. Hung. **1**: 261; 1926, Zool. Meded. **9**: 58. —Soehardjan, 1958, Idea **11**: 31. —Thornton, 1961, Proc. R. Ent. Soc. Lond. (B) **30**: 141. —Lee and Thornton, 1967, Pacific Ins. Monogr. **16**: 83.

Pseudocaecilius elutus var. *africanus* Badonnel, 1931, Ann. Sci. Nat. Zool. ser. 10 **14**: 230; 1946, Rev. Zool. Bot. Afr. **39** (2): 168; 1948, Rev. Zool. Bot. Afr. **40** (4): 292; 1955, Publ. Cult. Cia. Diamant Angola **26**: 200; 1959, Explor. Parc Nat. Albert, Mission G.F. de Witte (1933–1935) **95**: 18. —Smithers, 1960, J. Ent. Soc. S. Afr. **23** (1): 221; 1964, Rev. Zool. Bot. Afr. **70** (3–4): 253.

DISTRIBUTION: Bonin Is. (Chichi Jima), S. Mariana Is. (Saipan, Tinian, Guam), Caroline Is. (Palau, Yap, Ponape), and tropicopolitan.

BONIN IS. CHICHI JIMA: Jul. 1957, R.M. Bohart; Sakaiura, "Bull beach", May 1958, Snyder.

S. MARIANA IS. SAIPAN: Lamam Bay area, Dec. 1944, Dybas; hills E. of Garapan, beating, Jan. 1945, Dybas; Chalan Laulau area, Jan. 1945, Dybas. TINIAN: NW slope of Mt. Lasso, Mar. 1945, Dybas; Lake Hagoi, beating, Apr. 1945, Dybas. GUAM: Talofoto ridge, beating, Jan. 1945, Dybas.

PALAU. KOROR: sweeping, Mar. 1954; at light, May 1953; coconut leaves, breadfruit, Aug. 1953, Beardsley; sweeping, Jan. 1954, Beardsley; sweeping, Mar. 1954, Beardsley; May 1957; SW, 25 m, light trap, Gressitt.

YAP. Colonia, Aug. 1950, Goss.

PONAPE. Jun.–Sep. 1950, Adams.

67. *Pseudocaecilius marshalli* Karny

Pseudocaecilius marshalli Karny, 1926, Bull. Ent. Res. **16**: 288. —Banks, 1942, Bull. Bishop Mus. **172**: 27. —Thornton, 1961, Proc. R. Ent. Soc. Lond. (B) **30**: 149. —Lee and Thornton, 1967, Pacific Ins. Monogr. **16**: 86, 106.

DISTRIBUTION: Fiji, S. Mariana Is. (Guam).

S. MARIANA IS. GUAM: Piti, Jul. 1936, Oct. 1936; Sumay, Oct. 1936; Machanao, Jun. 1936; Libugon Farm, Jul. 1936; all by Swezey and Usinger.

68. *Pseudocaecilius tahitiensis* (Karny)

Epipsocus tahitiensis Karny, 1926, Bull. Ent. Res. **16**: 288.

Pseudocaecilius tahitiensis: Lee and Thornton, 1967, Pacific Ins. Monogr. **16**: 79.

DISTRIBUTION: Tahiti, S. Mariana Is. (Saipan, Tinian).

S. MARIANA IS. SAIPAN: Chalan Laulau area, beating, Jan. 1945, Dybas; hills E. of Garapan, beating, Jan. 1945, Dybas. TINIAN: ridge, SE section, Mar. 1945, Dybas.

Genus *Pseudoscottiella* Badonnel

Pseudoscottiella Badonnel, 1946, Zool. Rev. Bot. Afr. **39** (2): 170. —Lee and Thornton, 1967, Pacific Ins. Monogr. **16**: 5.

KEY TO MICRONESIAN SPECIES OF PSEUDOSCOTTIELLA

1. Forewing hyaline, or if pigment present it is confined to one or all of: pterostigma, areola postica, cell *Ax*.....2
Forewing pigmented in areas other than pterostigma, areola postica, cell *Ax*.....5
2. Areola postica uniform faint grey or hyaline.....3

- Areola postica with a proximal pigmented band.....4
3. Cell *4x* of forewing pigmented; hypandrium apically with small pointed projections73. **fuscistigma**
Cell *4x* of forewing as rest of wing, greyish hyaline; hypandrium simple, with apical serrations just discernible.....72. **clarkei**
4. In hindwing, veins r_{4+5} and *m* setose, in forewing pterostigma cell as rest of membrane75. **pallida**
In hindwing, veins r_{4+5} and *m* without long setae, in forewing pterostigmal cell granular76. **postica**
5. In forewing, whole of cell R_5 pigmented.....77. **pseudornatus**
In forewing, cell R_5 not completely pigmented.....6
6. In forewing, cell R_3 unpigmented.....7
In forewing, at least half of cell R_3 pigmented.....8
7. In forewing, both areola postica and cell *4x* uniformly pigmented.....74. **gressitti**
In forewing, areola postica pigmented only in basal half, cell *4x* pigmented in basal and apical thirds only.....70. **bifasciata**
8. In forewing, cell R_3 completely covered with pigment, which does not extend into cell R_171. **circularis**
In forewing, cell R_3 not completely pigmented, pigment extending into distal part of cell R_1 up to pterostigma.....69. **ornatus**
- 69. Pseudoscottiella ornatus** (Banks) NEW COMBINATION (fig. 18, a; 19, f; 20, a; 21, a)

Mepleres ornatus Banks, 1942, Bull. Bishop Mus. 172: 27.

MALE (redescription): Coloration (after softening in dil. NaOH following about 13 years dry storage). Vertex, gena and clypeus dark grey brown, frons lighter, rest of head very pale dirty grey. Eyes coffee black. Ocelli pale. Antenna with grey-brown scape and pedicel, flagellum light grey brown. Maxillary palp very pale grey. Dorsum and antedorsum of meso- and metathorax grey-brown, pleura and sterna slightly lighter. Forewing (fig. 18, a) greyish hyaline with grey-brown pigmented bands. Hindwing greyish hyaline with pale grey-brown pigmentation around basal region of *rs* and *m* and their junction. Legs very pale grey, with darker tibia and tarsus. Abdomen very light grey with grey-brown apex.

Morphology. I.O.: D. = 0.9: 1. In forewing *rs* and *m* fused for a short distance; r_{2+3} , r_{4+5} , m_1 and m_2 rather long; pterostigma long and narrow; areola postica elongated. Hindwing with r_{4+5} and *m* setose. Proximal hind tarsal segment with 14 ctenidiobothria; claws untoothed. Genitalia: hypandrium (fig. 20, a) apically bilobed, bearing laterally a pair of short posteriorly directed pointed sclerotized rods, and mesially a field of fine papillae. Penis frame (fig. 19, f) with broad base, outer parameres slightly divergent, inner parameres narrow, united at apex, point of fusion serrated; a pair of narrow sclerotized radula sclerites. Ninth abdominal tergite (fig. 21, a) with anterior band of sclerotization; along posterior margin at base of epiproct a pair of papillose strips. Paraproct with 10 trichobothria. Epiproct bears an apical field of papillae.

Body length (in alcohol): 1.9 mm.

Banks' figure of the forewing of this species (fig. 1, h, Banks 1942) is obviously upside down.

DISTRIBUTION: S. Mariana Is. (Guam).

S. MARIANA IS. GUAM: Plesiotype, ♂ (BISHOP) Pott's Junction, Oct. 1952, Krauss; Piti, Jul. 1936, Swezey & Usinger; Barrigada Jun. 1936,

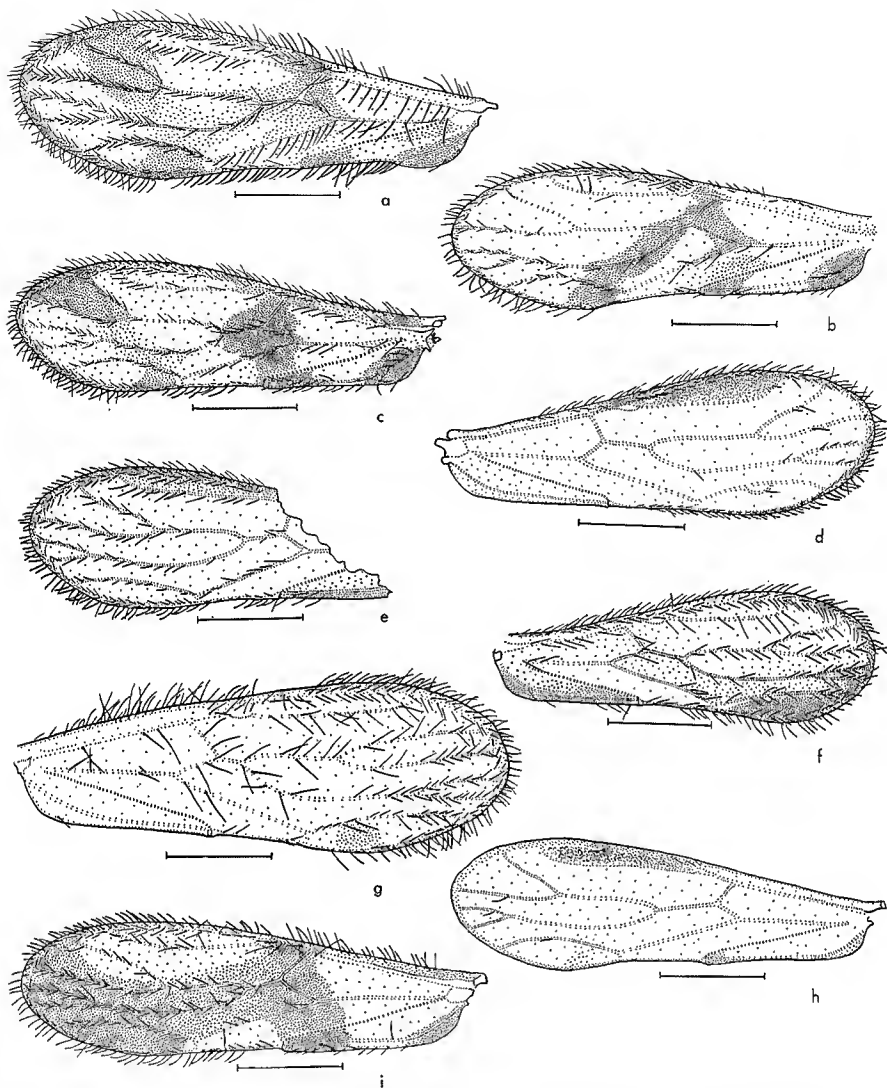


FIGURE 18.—Forewing: **a**, *Pseudoscottiella ornatus*; **b**, *P. bifasciata*; **c**, *P. circularis*; **d**, *P. clarkei*; **e**, *P. fuscistigma*; **f**, *P. gressitti*; **g**, *P. pallida*; **h**, *P. postica*; **i**, *P. pseudornatus*. Scales = 0.5 mm.

Swezey and Usinger; Pt. Oca, Jun. 1945, Krauss; Pt. Ritidian, Jun. 1945, Gressitt & R.M. Bohart; Yigo, Jul. 1958, Krauss.

70. *Pseudoscottiella bifasciata* Thornton, Lee & Chui, n. sp. (fig. 18, *b*; 22, *a, e, i*)

FEMALE: Coloration (after softening in dil. NaOH following 13 years dry storage). Head

generally pale with vertex and mesial borders of eyes brown. Eyes and ocelli pale. Maxillary palp very light grey. Antenna (damaged) light grey. Dorsum and antedorsum of meso- and metathorax dark grey brown. Thoracic pleura very pale grey. Forewing (fig. 18, b) hyaline, with a brown oblique band stretching from proximal angle of areola postica along the proximal region of *m*, the junction of *rs* and *m* and the bases of both; brown pigmentation in wing membrane on either side of distal tip of *an* and at proximal angle of cell *An*; veins light yellow brown. Hindwing hyaline, with brown band similar to forewing. Legs with pale grey coxa, trochanter and femur, light grey-brown tibia and tarsus. Abdomen very pale buff.

Morphology. I.O.: D. = 4.0: 1 (3.5: 1 in paratype). In forewing *rs* and *m* fused for a short distance, *M* cell distally rather narrow, areola postica long. Hindwing with r_{4+5} and *m* setose. Proximal hind tarsal segment with 13 ctenidiobothria; claw untoothed. Subgenital plate (fig. 22, e) simple and undivided, bearing 2 pairs of long setae. Gonapophyses (fig. 22, i): ventral valve slightly lobate with an apical bristled stylet; dorsal valve lobate, bearing a subapical stylet, bristled and projecting well beyond lobe; outer valve narrow at base and apex, with a broad middle portion and bearing about 11 long setae. Ninth abdominal tergite (fig. 22, a) with a submarginal sclerotized pattern along anterior border. Paraproct with 9 trichobothria.

Body length (in alcohol): 2.0 mm (2.1 mm in paratype).

MALE: Unknown.

Holotype, ♀ (BISHOP 9532), Caroline Is., Truk, Tol I., Mt. Unibot, 390 m, Jan. 2, 1953, Gressitt. Paratypes, Truk: Toloas-Erin, Apr. 1, 1940, Yasumatsu and Yoshimura; Moen I., 25–50 m, Feb. 3, 1953, Gressitt.

DISTRIBUTION: Caroline Is. (Truk).

71. *Pseudoscottiella circularis* Thornton, Lee & Chui, n. sp. (fig. 18, c; 19, a; 20, b; 21, b; 22, b, f, j)

MALE: Coloration (after softening in dil. NaOH following about 16 years dry storage). Vertex, frons, gena and clypeus brown; area between ocelli and clypeus lighter; rest of head very pale whitish grey. Eyes and ocelli pale. Antenna (damaged) with dark grey-brown scape and pedicel, grey-brown flagellum. Maxillary palp very pale grey. Dorsum and antedorsum of meso- and metathorax dark grey-brown. Pleura and sterna of thorax grey-brown. Forewing (fig. 18, c) hyaline with an oblique grey-brown apical band and grey-brown pigmentation around region of *rs* and *m* junction, *An* and *Cu*₁ cells and proximal half of costal region; veins *r*₁ and *m* near *rs-m* junction pale, otherwise dark brown. Hindwing greyish hyaline, fainter in some areas; veins yellow-brown, lighter distally. Legs with grey tibia and tarsus, rest of leg pale grey. Abdomen very pale grey with dark grey apex.

Morphology. I.O.: D. = 2.6: 1 (2.8: 1 in paratype). In forewing *rs* and *m* fused for a distance; r_{2+3} and r_{4+5} distally divergent forming a bell-shaped *R*₃ cell; pterostigma long and narrow, areola postica long, slightly angular. Hindwing: veins with very fine hairs; r_{2+3} , r_{4+5} and *m* without long setae. Proximal hind tarsal segment with 13 ctenidiobothria; claw untoothed. Genitalia: hypandrium (fig. 20, b) bilobed, with shallow mesial indentation between lobes; bearing laterally a pair of short, posteriorly directed, pointed sclerotized rods; at base of lobes a field of fine papillae. Penis frame (fig. 19, a) with broad base; outer parameres broad and divergent; inner parameres united at apex; with a pair of broad, pointed sclerotized radula rods. Ninth abdominal tergite (fig. 21, b) with anterior band of sclerotization; its posterior margin, at base of epiproct, with a pair of knob-shaped thorn-covered projections. Paraproct with 10 trichobothria. Epiproct without apical field of papillae.

Body length (in alcohol): 1.5 mm.

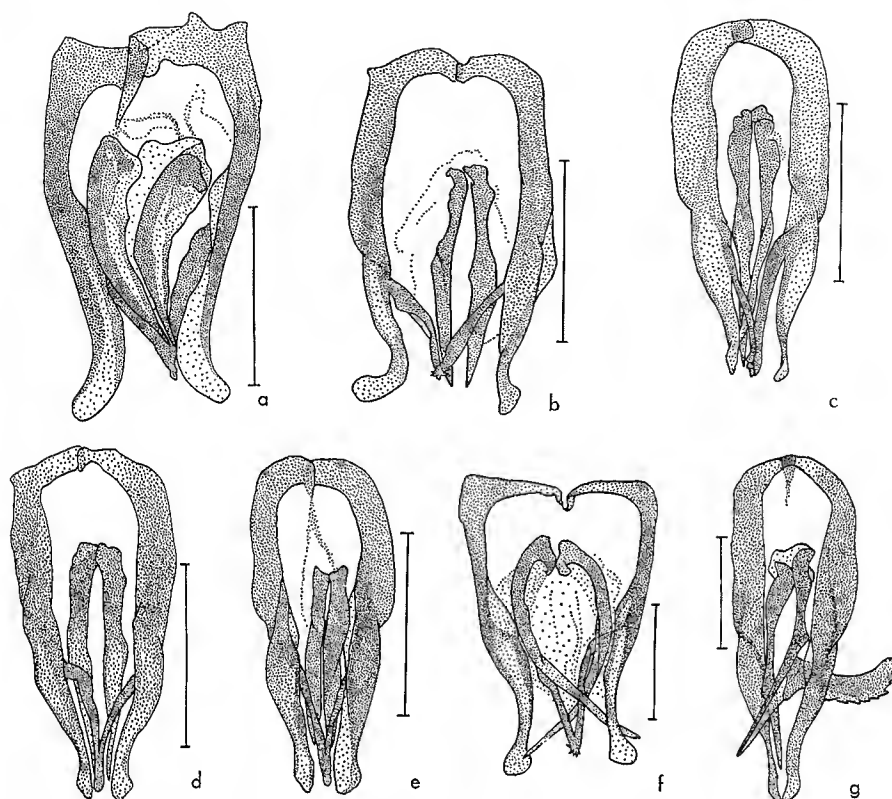


FIGURE 19.—Penis frame: **a**, *Pseudoscottiella circularis*; **b**, *P. clarkei*; **c**, *P. fuscistigma*; **d**, *P. gressitti*; **e**, *P. postica*; **f**, *P. ornatus*; **g**, *P. pseudornatus*. Scales = 0.1 mm.

FEMALE: Coloration (after softening in dil. NaOH following about 16 years dry storage). Head generally grey. Eyes and ocelli pale. Antenna (damaged) light yellow brown. Maxillary palp lost. Thorax light grey brown. Forewing hyaline with grey-brown pigmentation around region of *rs* and *m* junction, proximal and distal angles of *Cu*₂ and *An* cells and proximal angle of areola postica; vein *r*₄₊₅ grey-brown, other veins faint and indistinct. Hindwing hyaline. Bases of *rs* and *m*, their junction and *cu*₁ brown, other veins faint. Abdomen very light grey.

Morphology. I.O.: D. = 4.0: 1. In forewing *rs* and *m* fused for a distance, *r*₂₊₃, *r*₄₊₅, *m*₁, and *m*₂ long, areola postica elongate. Hindwing: *r*₂₊₃, *r*₄₊₅ and *m* without long setae. Legs lost. Subgenital plate (fig. 22, f) simple, undivided, bearing five long setae. Gonapophyses (fig. 22, j): ventral valve slightly lobate with apical stylet bearing spinelets; dorsal valve lobate with subapical stylet bearing spinelets and projecting well beyond lobe; outer valve barrel-shaped, covered with more than eight long setae. Ninth abdominal tergite (fig. 22b) with submarginal sclerotized pattern along anterior border. Paraproct with 10 trichobothria.

Body length (in alcohol): 1.6 mm.

Holotype, ♂ (US 71412), Ponape, Caroline Is., Ag. Exp. Stn., Jun.–Sep. 1950, Adams. Allotype, ♀ (US), same data. Paratypes, Ponape: Paliker-

Kolonia, Jan. 16, 1938, Esaki.

DISTRIBUTION: Caroline Is. (Ponape).

72. *Pseudoscottiella clarkei* Thornton, Lee & Chui, n. sp. (fig. 18, *d* 19, *b*; 20, *c*; 21, *c*)

MALE: Coloration (after softening in dil. NaOH following about 9 years dry storage). Head generally brown. Eyes coffee brown. Ocelli pale. Antenna (damaged) light grey-brown. Maxillary palp very pale. Thorax brown. Forewing (fig. 18, *d*) greyish hyaline with light grey-brown pigmentation in pterostigma, veins light yellow-grey. Hindwing hyaline, veins faint and indistinct. Legs uniformly very light grey. Abdomen very light yellow.

Morphology. I.O.: D. = 0.9: 1. In forewing r_{2+3} , r_{4+5} , m_1 and m_2 rather long; rs and m fused for a distance; pterostigma slightly rounded distally, arcula postica long. In hindwing m forked, m_1 incomplete; veins r_{2+3} , r_{4+5} , m_1 and m_2 without long setae. Proximal hind tarsal segment with 13 ctenidiobothria; claw untoothed. Genitalia: hypandrium (fig. 20, *c*) simple, undivided, serrated at apex. Penis frame (fig. 19, *b*) broad; inner parameres united at apex, point of fusion serrated; with a pair of sclerotized radula rods. Ninth abdominal tergite (fig. 21, *c*) with anterior sclerotized band. Paraproct with 10 trichobothria. Apex of epiproct with a field of papillae.

Body length (in alcohol): 2.0 mm.

FEMALE: Unknown.

Holotype, ♂ (US 71413), Caroline Is., Palau, Babelthuap, Ngiwal, May 19, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

73. *Pseudoscottiella fuscistigma* Thornton, Lee & Chui, n. sp. (fig. 18, *e*; 19, *c*; 20, *d*; 21, *d*)

MALE: Coloration (after softening in dil. NaOH following about 9 years dry storage). Head generally grey, vertex and mesial borders of eyes grey-brown. Eyes and ocelli pale. Antenna and maxillary palp lost. Thoracic sclerites grey-brown. Forewing (fig. 18, *e*) proximal portion damaged, hyaline, with grey-brown pigmentation in pterostigma and An , light grey pigmentation in Cu_2 ; veins grey-brown. Legs with grey-brown tibia and tarsus, rest of leg very pale grey. Abdomen very pale with grey apex.

Morphology. I.O.: D. = 2.7: 1. In fore wing rs and m fused for a distance, R_3 cell bell-shaped, pterostigma long and narrow, arcula postica elongate, flat. Proximal hind tarsal segment with 13 ctenidiobothria; claw untoothed. Genitalia: hypandrium (fig. 20, *d*) simple, undivided, bearing apically a pair of small pointed sclerotized projections. Penis frame (fig. 19, *c*); outer parameres slightly convergent; inner parameres united at apex for a distance, point of fusion serrated; a pair of sclerotized radula rods. Ninth abdominal tergite (fig. 21, *d*) with an anterior sclerotized band. Paraproct with 19 trichobothria. Apex of epiproct with a field of papillae.

Body length (in alcohol): 1.8 mm.

FEMALE: Unknown.

Holotype, ♂ (US 71414), Caroline Is., Palau, Ulebsehel, SE, beach, Apr. 24, 1957, Sabrosky. Paratypes, Palau: Babelthuap: Ngiwal, at light, May 19, 1957.

DISTRIBUTION: Caroline Is. (Palau).

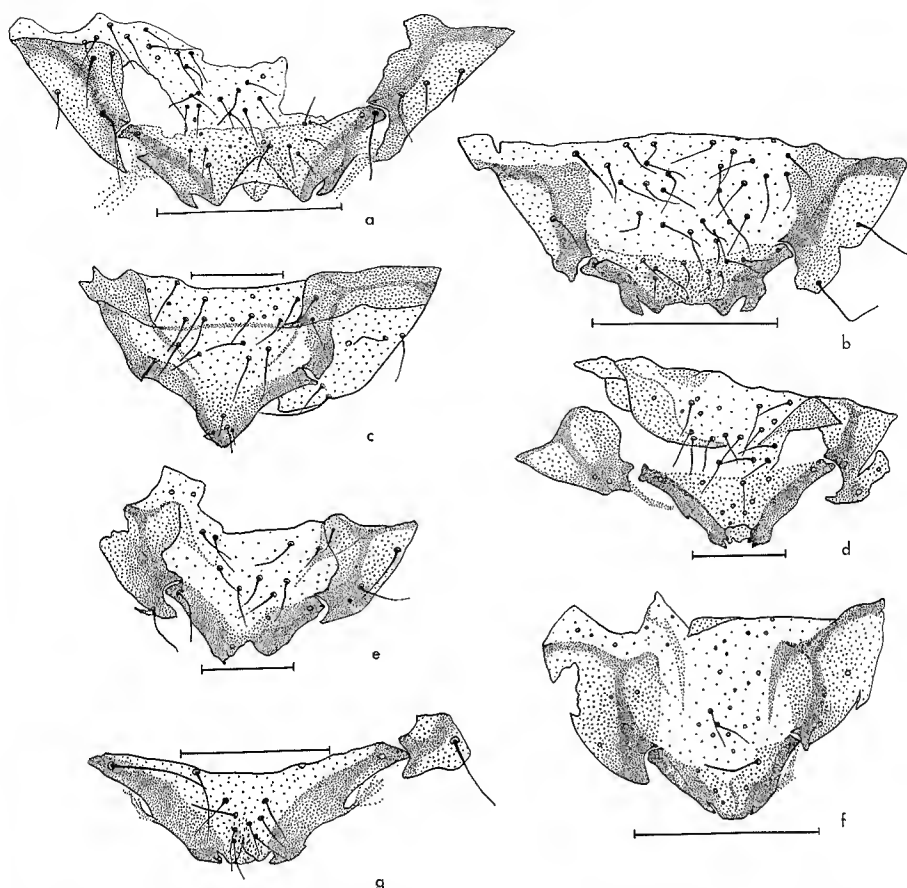


FIGURE 20.—Hypandrium: **a**, *Pseudoscottiella ornatus*; **b**, *P. circularis*; **c**, *P. clarkei*; **d**, *P. fuscistigma*; **e**, *P. gressitti*; **f**, *P. postica*; **g**, *P. pseudornatus*. Scales a–b, f = 0.2 mm; c–e, g = 0.1 mm.

74. *Pseudoscottiella gressitti* Thornton, Lee & Chui, n. sp. (fig. 18, f; 19, d; 20, e; 21, e)

MALE: Coloration (after softening in dil. NaOH following about 13 years dry storage). Vertex, frons, clypeus and gena dark brown with two paler areas on either side of ocelli near antero-mesial border of eyes; rest of head very light grey-brown. Eyes very light yellow-brown. Ocelli pale. Antenna (damaged) with dark grey-brown scape and pedicel. Maxillary palp very light grey. Dorsum and antedorsum of meso- and metathorax dark grey-brown, rest of thorax slightly lighter. Forewing (fig. 18, f) hyaline with dark grey-brown pigmentation in arcola postica and cell *An* extending into distal angle of *Cu*₂; light grey-brown pigmentation along costal region and distal half of *M* cell; entire *m* vein including its fusion with *rs* and *cu*₁ dark grey-brown, rest of veins light yellowish brown. Hindwing greyish hyaline, veins *r*₂₊₃, *r*₄₊₅ and *an* faint, other veins grey. Legs light grey-brown. Abdomen grey with dark grey-brown apex.

Morphology. I.O.: D. = 1.0: 1. In forewing r_5 and m fused for a distance, M_1 cell very narrow, areola postica long and flat. Hindwing: r_{2+3} , r_{4+5} and m without long setae. Proximal hind tarsal segment with 13 ctenidiobothria; claw without preapical tooth. Genitalia: hypandrium (fig. 20, e) with a pair of pointed apical lobes without accessory sclerites. Penis frame (fig. 19, d); outer parameres convergent; inner parameres fused for a distance, point of fusion serrated; a pair of sclerotized radula rods. Ninth abdominal tergite (fig. 21, e) heavily sclerotized along anterior margin. Paraproct with a field of 10 trichobothria. Epiproct with an apical field of papillae.

Body length (in alcohol): 1.8 mm.

FEMALE: Unknown.

Holotype, ♂ (US 71415), Caroline Is., Palau, Koror, NE, limestone ridge, 40 m, Dec. 14, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau).

75. *Pseudoscottiella pallida* Thornton, Lee & Chui, n. sp. (fig. 18, g; 22, c, h)

FEMALE: Coloration (after softening in dil. NaOH following 13 years dry storage). Head very pale grey. Eyes and ocelli pale. Antenna (damaged) with flagellum light grey, scape and pedicel slightly lighter. Maxillary palp very pale grey-brown. Thorax very pale grey. Forewing (fig. 18, g) hyaline except a proximal yellow-brown band in areola postica; veins faintly yellow-brown, darkening distally. Hindwing hyaline, veins faint and indistinct. Legs: tibia and proximal tarsal segment grey, rest of leg pale grey. Abdomen very pale grey.

Morphology. I.O.: D. = 3.3: 1. In forewing r_5 and m fused for a distance; r_{2+3} and r_{4+5} rather long; R_3 cell long and narrow; veins m_1 and m_2 distally slightly convergent, areola postica long and flat. In hindwing r_{4+5} and m setose. Proximal hind tarsal segment with 14 ctenidiobothria; claw untoothed. Subgenital plate and gonapophyses (except dorsal valve) missing. Dorsal valve (fig. 22, h) lobate, bearing a bristled stylet projecting well beyond lobe. Ninth abdominal tergite (fig. 22, c) with submarginal sclerotized pattern along anterior border. Paraproct with 10 trichobothria.

Body length (in alcohol): 2.6 mm.

MALE: Unknown.

Holotype, ♀ (US 71416), Caroline Is., Palau, Koror, NE, limestone ridge, 40 m, Dec. 14, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau).

76. *Pseudoscottiella postica* Thornton, Lee & Chui, n. sp. (fig. 19, e; 18, h; 20, f; 21, f)

MALE: Coloration (after softening in dil. NaOH following about 13 years dry storage). Head (damaged) generally very light brown with no markings. Eyes light brown. Ocelli faint. Antenna (badly damaged), light brown. Maxillary palp lost. Thorax light brown. Forewing (fig. 18, h) hyaline, areola postica with a brown proximal band, pterostigma granular, veins faint, in distal quarter light brown. Hindwing hyaline with faint veins. Legs very light brown. Abdomen very light brown.

Morphology. I.O.: D. = 0.6: 1. In forewing r_5 and m fused for a distance, r_{2+3} and r_{4+5} long and distally slightly divergent, m_1 and m_2 short; areola postica long and flat, pterostigma long. Hindwing membrane with small fine hairs; r_{2+3} , r_{4+5} and m without long setae. Proximal hind tarsal segment with 14 ctenidiobothria; claw untoothed. Genitalia: hypandrium (fig. 20, f) simple, undivided, laterally bearing a small pair of pointed, posteriorly directed sclerotized rods. Penis frame (fig. 19, e) with rather broad lateral sclerites; outer parameres more or less

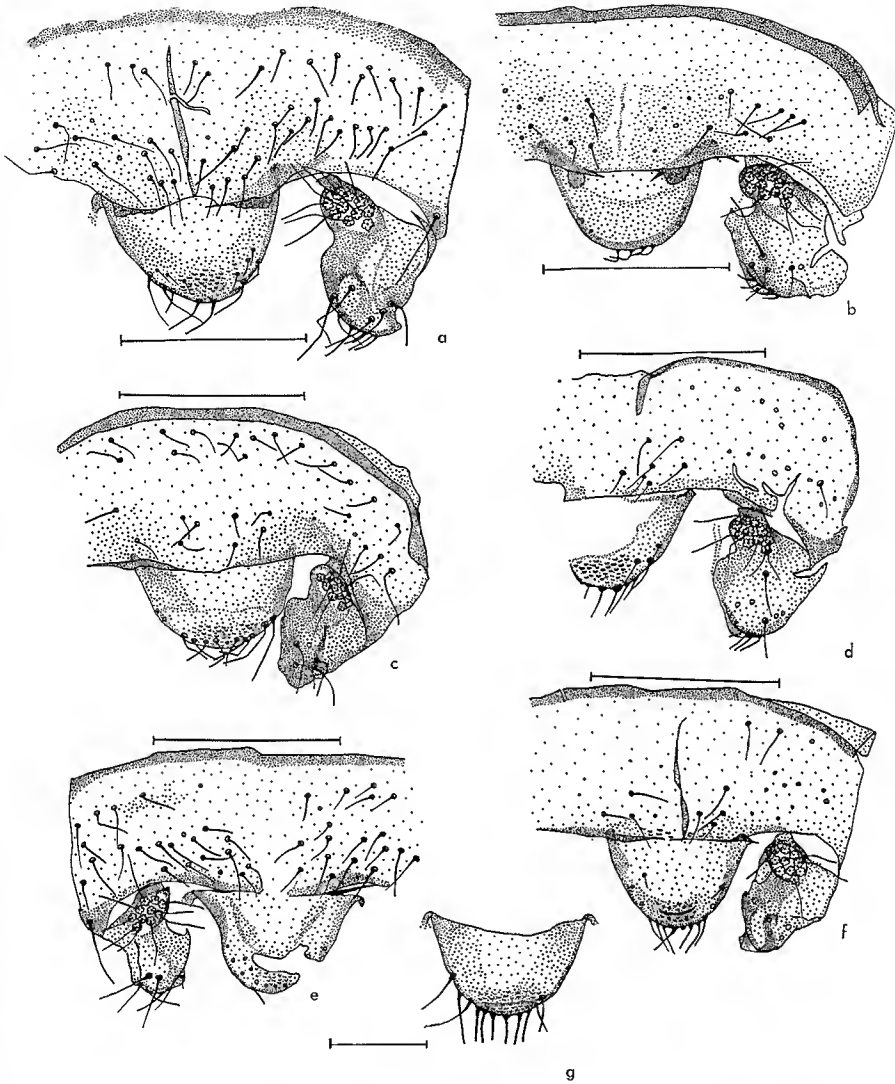


FIGURE 21.—Ninth abdominal tergite, epiproct and paraproct of male: **a**, *Pseudoscottiella ornatus*; **b**, *P. circularis*; **c**, *P. clarkei*; **d**, *P. fuscistigma*; **e**, *P. gressitti*; **f**, *P. postica*; male epiproct: **g**, *P. pseudornatus*. Scales a-f = 0.2 mm; g = 0.1 mm.

parallel; inner parameres united at apex for a distance; with a pair of sclerotized radula rods. Ninth abdominal tergite (fig. 21, f) with anterior band of sclerotization. Paraproct with 10 trichobothria. Epiproct with an apical field of papillae.

Body length (in alcohol): 1.8 mm.

FEMALE: Unknown.

Holotype, ♂ (US 71417), Caroline Is., Yap, Map I., E, Jul.–Aug. 1950, Goss.

DISTRIBUTION: Caroline Is. (Yap).

77. *Pseudoscottiella pseudornatus* Thornton, Lee & Chui, n. sp. (fig. 18, i; 19, g; 20, g; 21, g; 22, d,g,k)

FEMALE: Coloration (after softening in dil. NaOH following 13 years dry storage). Vertex, frons, gena and clypeus grey-brown with a lighter area on either side of ocelli, rest of head very light brown. Eyes and ocelli palc. Antenna (damaged) with dark brown scape and pedicel, pale grey flagellum. Maxillary palp very light grey. Thorax dark brown. Forewing (fig. 18, i) dark grey-brown, with three large hyaline areas; veins brown. Hindwing greyish hyaline with brown veins. Legs: femur and trochanter very pale grey, coxa pale grey with a dark grey-brown area, rest of leg grey-brown. Abdomen light brown with dark brown apex.

Morphology. I.O.: D. = 3.5: 1. In forewing *rs* and *m* fused for a distance, r_{2+3} and r_{4+5} long and distally divergent; areola postica elongate. Hindwing: r_{2+3} , r_{4+5} and *m* without long setae. Proximal hind tarsal segment with 14 ctenidiobothria; claw untoothed. Subgenital plate (fig. 22, g) simple, undivided, bearing 2 pairs of long subapical setae. Gonapophyses (fig. 22, k): ventral valve lobate, with apical stylet bearing spinelets; dorsal valve lobate, subapical stylet long, projecting well beyond lobe and bearing spinelets; outer valve elongated, cylindrical, bearing about 10 long setae. Ninth abdominal tergite (fig. 22, d) with anterior submarginal sclerotized patterns. Paraproct with 10 trichobothria.

Body length (in alcohol): 2.0 mm.

MALE: Coloration (after softening in dil. NaOH following 13 years dry storage). Color pattern as female, slightly darker.

Morphology. I.O.: D. = 2.7: 1. Venation of forewing as female. Hindwing and legs damaged and lost. Genitalia: hypandrium (fig. 20, g) medially with field of small spines, incipient lateral lobes. Penis frame (fig. 19, g) peculiar, with a pair of tapering radula rods and a median serrate sclerite. Epiproct (fig. 21, g) with apical field of papillae.

Body length (in alcohol): 1.6 mm.

Holotype, ♀ (US 71418), Caroline Is., Palau, Ngurukdabel, NE, Ngare-medu, 180 m, Dec. 1952, Gressitt. Allotype, ♂ (BISHOP 9533), Palau, Koror, May 1953, Beardsley.

DISTRIBUTION: Caroline Is. (Palau).

The *Pseudoscottiella* species from Micronesia differ from those collected from Africa in general in the following features: the areola postica in the forewing is larger and longer, and the branches of the radial fork are longer; the structure of the hypandrium and penis frame (with sclerotized radula rods); the subgenital plate (possessing a well-developed and clearly marked-off apical lobe); the shape of the outer valve of the gonapophyses.

Examination of the species in Micronesia for morphological similarities in order to suggest relationships, leads to an impasse, as so often in archipelago studies unless numerical methods are used and complete overall similarities compared. The characteristics of the species show a mosaic distribution—groups of species which show similarities in one character or group of characters do not fall together if other groups of characters are considered.

Thus, *P. bifasciata* (Truk), *P. circularis* (Ponape), *P. pseudornatus* (Palau)

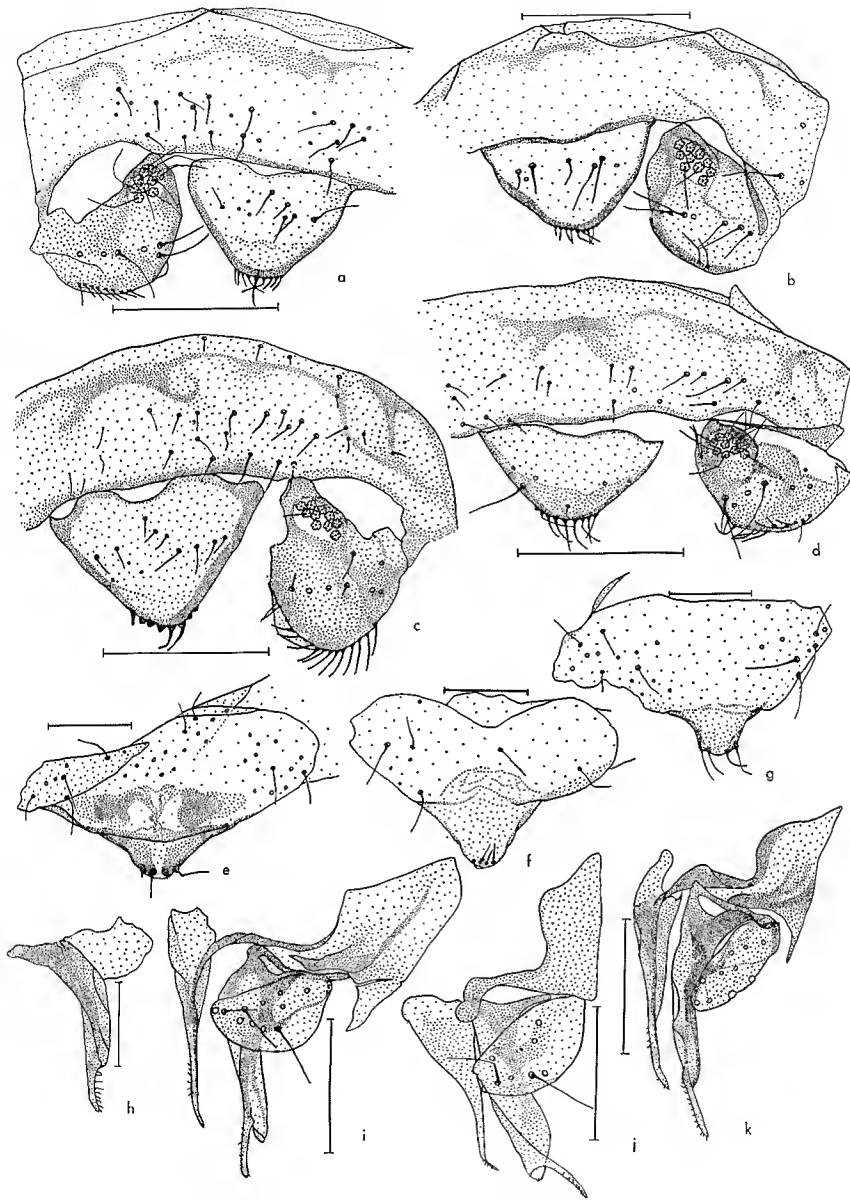


FIGURE 22.—Ninth abdominal tergite, epiproct and paraproct of female: **a**, *Pseudoscottiella bifasciata*; **b**, *P. circularis*; **c**, *P. pallida*; **d**, *P. pseudornatus*; subgenital plate of female: **e**, *P. bifasciata*; **f**, *P. circularis*; **g**, *P. pseudornatus*; female gonapophyses: **h**, *P. pallida* (dorsal valve); **i**, *P. bifasciata*; **j**, *P. circularis*; **k**, *P. pseudornatus*. Scales a-d = 0.2 mm; e-k = 0.1 mm.

and *P. ornatus* (Guam) are similar to each other, and differ from other Micronesian species in possessing a well-marked and in general fairly similarly distributed forewing pattern. If, however, male genitalia are considered, then *P. ornatus* and *P. circularis* must be grouped together with *P. clarkei* and possibly *P. gressitti* in possessing a similarly constructed penis frame, which differs from that of the other species, including *P. pseudornatus*. On hypandrial characteristics, *P. ornatus* and *P. circularis* again show similarity with *P. pseudornatus*.

In female genitalia, the three species which are sufficiently known are all fairly similar, *P. bifasciata* and *P. circularis* being rather closer to each other than either is to *P. pseudornatus*.

From the evidence available, it can be said that *P. fuscistigma* (Palau) and *P. postica* (Yap) are very closely related; that *P. ornatus* (Guam) and *P. circularis* (Ponape) are also closely related and show some similarities to *P. pseudornatus* (Palau) and *P. bifasciata* (Truk), and a rather more tenuous relationship to *P. clarkei* (Palau), which stands somewhat apart. The relationships of *P. gressitti* (Palau) and *P. pallida* (Palau) are difficult to determine. When more specimens of these and other *Pseudoscottiella* species are available from Micronesia, including where possible material of both sexes, it should be possible to subject them to a comprehensive and quantitative analysis of overall similarities, which together with distributional data should provide a better basis for suggesting relationships.

FAMILY ARCHIPSOCIDAE Pearman, 1936

CHARACTERISTICS: Wings setose, venation incomplete, wings often reduced or absent; gonapophyses reduced or absent (if viviparous); tarsi 2-segmented.

Genus *Archipsocus* Hagen

Archipsocus Hagen, 1882. Stettin. Ent. Ztg. **43**: 225. —Roesler, 1944, Stettin. Ent. Ztg. **105**: 153. —Badonnel, 1948, Rev. Zool. Bot. Afr. **40** (4): 294. —Mockford, 1953, Florida Ent. **36** (3): 113.

KEY TO MICRONESIAN SPECIES OF ARCHIPSOCUS

- Macropterous, hindwing without setae on membrane of posterior basal cells; female gonapophyses lacking.....**78. dybasi**
Macropterous, hindwing posterior basal cells setose, or micropterous; female gonapophyses complete.....**79. spinosus**

78. *Archipsocus* (*Archipsocopsis*) *dybasi* Thornton, Lee & Chui, n. sp. (fig. 23, a, b, h)

FEMALE: Coloration (after c. 20 years alcohol storage). Whole insect very pale brown, wings hyaline.

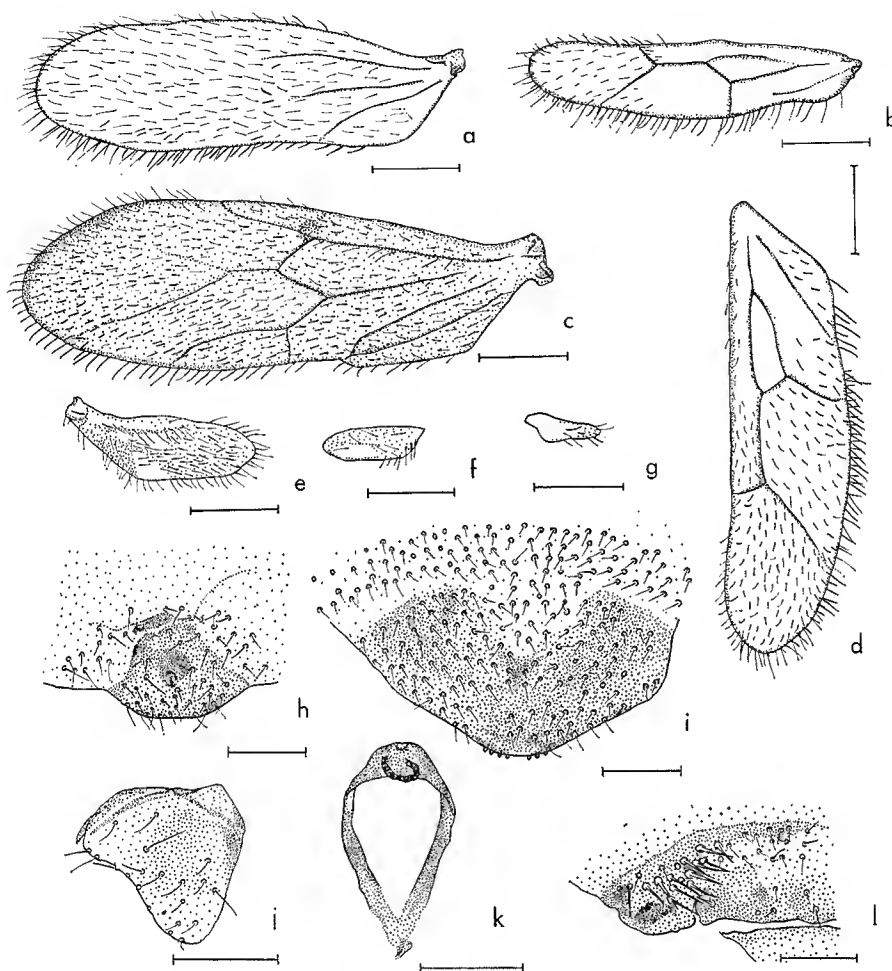


FIGURE 23.—*Archipsocus dybasi*: a, forewing; b, hindwing; *A. spinosus*: c, female macropterous forewing; d, female macropterous hindwing; e, female micropterous forewing; f, female micropterous hindwing; g, male micropterous forewing; *A. dybasi*: h, subgenital plate; *A. spinosus*: i, subgenital plate; j, gonapophyses; k, penis frame; l, male ninth abdominal tergite. Scales a–g = 0.2 mm; h–l = 0.1 mm.

Morphology. Forewing venation (fig. 23, a) as in the following species but veins unpigmented and discerned only with extreme difficulty. Hindwing (fig. 23, b) without setae on membrane of basal cells. Subgenital plate (fig. 23, h) setose, somewhat straight-edged posteriorly. Without gonapophyses. Paraproct without trichobothria in basal rosette sockets, reduced, ciliation sparse.

Body length (in alcohol): 1.6 mm.

MALE: Unknown.

Holotype, ♀ (FM), Mariana Is., Tinian, ridge 1 mile N. of Tinian Harbor,

beating, Apr. 10, 1945, Dybas. Paratype, ♀ (BISHOP), Tinian: Gurgan Pt., beach coves, sifting leaf litter, Apr. 5, 1945, Dybas.

DISTRIBUTION: S. Mariana Is. (Tinian).

This presumably viviparous species, included in the subgenus *Archipsocopsis* by virtue of the fact that gonapophyses are absent, differs from *A. intermedius* Smithers in being macropterous, from *A. bifurcatus* Smithers and *A. machadoi* Bad. in forewing venation, from *A. albofasciatus* Bad. and *A. fernandi* Pearman in forewing pattern, from *A. minutus* Bad., *A. balli* Bad., *A. biguttatus* Pearman, *A. bicolor* Bad. and *A. frater* Mockford in coloration and from *A. mendax* Bad. in wing pigmentation and in lacking setae on the membrane of the basal cells of the hindwing.

It resembles *A. aneura* Bad. (Africa) in a number of respects, notably in the reduction, in size and chaetotaxy, of the paraprocts. *A. aneura*, however, has brown forewings; it seems unlikely that this species has faded completely in the 20 years of storage in view of the fact that the following species, after being stored for the same time, still possesses pigmented forewings.

79. *Archipsocus* (*Archipsocus*) *spinosus* Thornton, Lee & Chui, n. sp.

(fig. 23, c–g, i–l)

Macropterous form

FEMALE: Coloration (after c. 20 years alcohol storage). Head and thorax light brown; antennae, maxillary palps and legs somewhat paler; abdomen cream, pale brown laterally. Forewing light brown; hindwing hyaline.

Morphology. Forewing (fig. 23c) with veins in apical third not distinguishable, *rs* and *m* fused for a long stretch, areola postica well formed. Hindwing (fig. 23, d) setose in basal cells, venation complete. Subgenital plate rounded, setose, sclerotized area irregularly emarginate antero-mesially (fig. 23, i). Gonapophyses (fig. 23, j) complete, dorsal and ventral valves styliform, outer valves wide, with 10–12 setae along posterior margin. A single trichobothrium on each paraproct.

Body length (in alcohol): 1.6 mm.

Micropterous form

FEMALE: (micropterous). Coloration. As macropterous form.

Morphology. As macropterous form except for reduction of wings (fig. 23, e, f) and the fact that there is no trichobothrium on the paraproct with a rosette basal socket.

MALE: Coloration (after c. 20 years alcohol storage). As female.

Morphology. Micropterous, forewing (fig. 23, g) not reaching first abdominal tergite, hindwings absent. Penis frame (fig. 23, k) oval, posteriorly with an inner ring-shaped sclerite. Ninth abdominal tergite each side with a dense field of very stout pointed spines (fig. 23, l).

Body length (in alcohol): 1.5 mm.

Holotype, ♀ (FM), Mariana Is., Tinian, Lake Hagoi, beating, Apr. 4, 1945, Dybas. Allotype, ♂ (FM), same data. Paratypes, Saipan: Papago area, beating, Jan. 17, 1945, Dybas; hills E. of Garapan, beating, Jan. 23, 1945, Dybas. Tinian: NW slope Mt. Lasso, under bark, Mar. 17, 1945, Dybas; same locality, beating, Mar. 25, 1945, Dybas; May 1945, Dybas.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian).

This oviparous species with fully developed female gonapophyses differs from all previously described forms notably in the presence on the male ninth abdominal tergite of the two conspicuous fields of stout spines and the peculiar ring-shaped sclerite on the penis frame. The presence of setae on the membrane of the basal cells of the hindwing, a trichobothrium on the paraproct, and a pale abdomen and light brown head and thorax, also serve, either separately or in combination, to distinguish it from other described species.

FAMILY MYOPSOCIDAE Enderlein, 1903

CHARACTERISTICS: In forewing areola postica fused to media for a short distance or connected to it by a short crossvein; forewings glabrous, often mottled with more or less irregular and confluent brown spots; gonapophyses complete, with very long thin dorsal valve; tarsi 3-segmented.

KEY TO MICRONESIAN GENERA OF MYOPSOCIDAE

Apex of forewing with posterior margin incurving between apices of veins...**Lophopterygella**
Forewing margin normal.....**Myopsocus**

Genus **Lophopterygella** Enderlein

Lophopterygella Enderlin, 1907, Notes Leyden Mus. 29: 121.

80. **Lophopterygella cincticornis** Thornton, Lee & Chui, n. sp. (fig. 24, a; 25, c; 26, a, f)

FEMALE: Coloration (after c. 20 years alcohol storage). Head buff, vertex flecked with fairly small distinct brown spots, in usual pattern. Frons medially with two pairs of spots, a narrow brown line along posterior border and a wider curved brown line just mesial to antennal sockets. Clypeus with converging striae of separate brown spots. Genae unmarked, except a brown line below orbit, another below antennal socket, a third along distal edge of gena. Eyes black; ocelli very dark brown along inner margins. Antennae buff, scape and pedicel flecked with brown, basal flagellar segment with alternating buff and brown stretches, eight brown stretches in all, these longer apically, second segment with seven rather longer brown stretches, third segment with five, succeeding segments with longer and fewer brown stretches. Maxillary palps buff, tip of apical segment brown. Thoracic terga generally buffish brown, a darker brown median line along dorsum of thorax. Pleura buff, a narrow irregular brown line above coxae. Legs buff. Forewing (fig. 24, a), similarly patterned to that of *L. camelina*. Hindwing without any apparent banding on margin. Abdomen cream, dark grey-brown transverse bands dorsally, widening laterally, ventrally four such bands on basal portion, fusing laterally; abdomen cream laterally.

Morphology. I.O.: D. = 4.0: 1, occiput mesial to orbits raised into rounded humps, a median depression. Clypeus prominent, bulging. Basal hind tarsal segment with 24 ctenidobothria. Forewing with anal flap (fig. 24, a). Subgenital plate (fig. 25, c) with a pair of longitudinal sclerotized ridges, margin with a pair of small, fairly wide-set lobes. Gonapophyses (fig. 26, a). A field of 29 trichobothria and a prominent band of setae on each paraproct (fig. 26, f).

Body length (in alcohol): 2.0 mm.

MALE: Unknown.

Holotype, ♀ (FM), Mariana Is., Tinian, Lake Hagoi, beating, Apr. 4, 1945, Dybas.

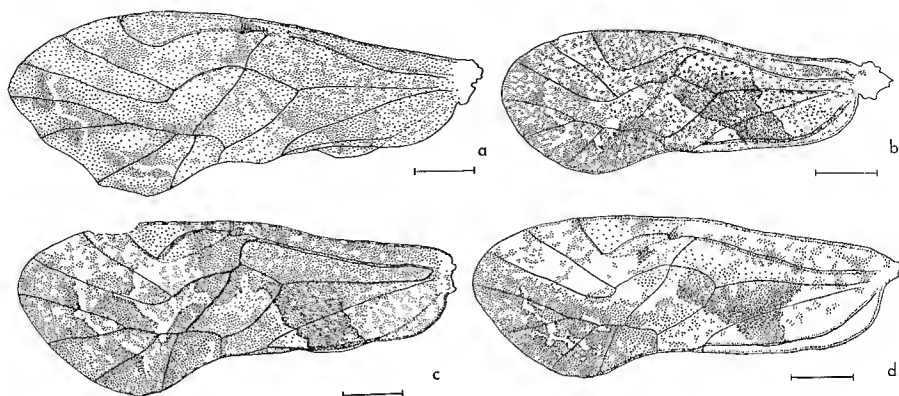


FIGURE 24.—Forewing (female): **a**, *Lophopterygella cincticornis*; **b**, *Myopsocus clunius*; **c**, *M. palauensis*; **d**, *M. punctatus*. Scales = 0.5mm.

DISTRIBUTION: S. Mariana Is. (Tinian).

This species is similar to *L. camelina* End., which occurs in Taiwan, the Philippines, and Java. It differs, however, in the subgenital plate (that figured by Enderlein having smaller, more closely adjacent apical lobes), and in the markings of the flagellar segments, those of *L. camelina* having but a single apical brown band per segment.

Other species of this genus are reported from China (*L. lunata* Navas), Pemba (*L. bursulipennis* End.), Haiti (*L. haitiensis* Banks), and the United States (*L. lichenatus* (Walsh)). Another species occurs in Fiji, as yet undescribed.

Genus *Myopsocus* Hagen

Myopsocus Hagen, 1866, Verh. Zool. Bot.-Ges. Wien. **16**: 201. —Smithers, 1964, Proc. R. Ent. Soc. Lond. (B) **33** (7-8): 133.

The species below are provisionally assigned to the genus *Myopsocus* sens. lat. (see discussion by Smithers, 1964, Proc. R. Ent. Soc. Lond. (B) **33**: 133).

KEY TO MICRONESIAN SPECIES OF MYOPSOCUS

1. Dark oblique band in basal half of forewing narrowing posteriorly to a quarter its anterior width; female subgenital plate with club-shaped apical process carrying 2 long and about 8 short setae.....**84. punctatus**
 Dark oblique band in basal half of forewing narrowing posteriorly to no less than half its anterior width; female subgenital plate apical process not club-shaped, not bearing setae of two distinct lengths.....2
2. Female subgenital plate apical process gradually narrowing to apex which bears a pair of setae; penis frame ring-like, oval.....**82. clunius**
 Female subgenital plate apical process 2-pronged apically, with a number of short setae at base of fork; penis frame broad basally, very narrow in apical half...**83. palauensis**

81. *Myopsocus bakeri* Banks

Myopsocus bakeri Banks, 1916, Philipp. J. Sci. (D) **11**: 199; 1942, Bull. Bishop Mus. **172**: 25.

DISTRIBUTION: Philippines, S. Mariana Is. (Guam).

S. MARIANA IS. GUAM: Tarague, May 1936, Swezey and Usinger (Banks 1942).

This record by Banks is questionable.

82. *Myopsocus clunius* Thornton, Lee & Chui, n. sp. (fig. 24, b; 25, d; 26, d; 27, c,e,g)

FEMALE: Coloration (after c. 24 years dry storage). Not clearly discernible, apart from: forewing (fig. 24, b) similar to those of *Myopsocus palauensis* and *M. punctatus*, except that basal dark patch is different in shape; hindwing with costa clearly banded only distal to apex of vein *r*; hind leg femur brown, tibia light brown, darker apically, basal tarsal segment light brown, distal segments dark; abdomen with dark transverse bands dorsally, these often interrupted each side of mid-line; eyes grey, mottled with dark brown.

Morphology. I.O.: D. = 2.0: 1. Basal hind tarsal segment with 18 ctenidiobothria. Subgenital plate (fig. 25, d) apical process without subapical setae, with a pair of fairly short

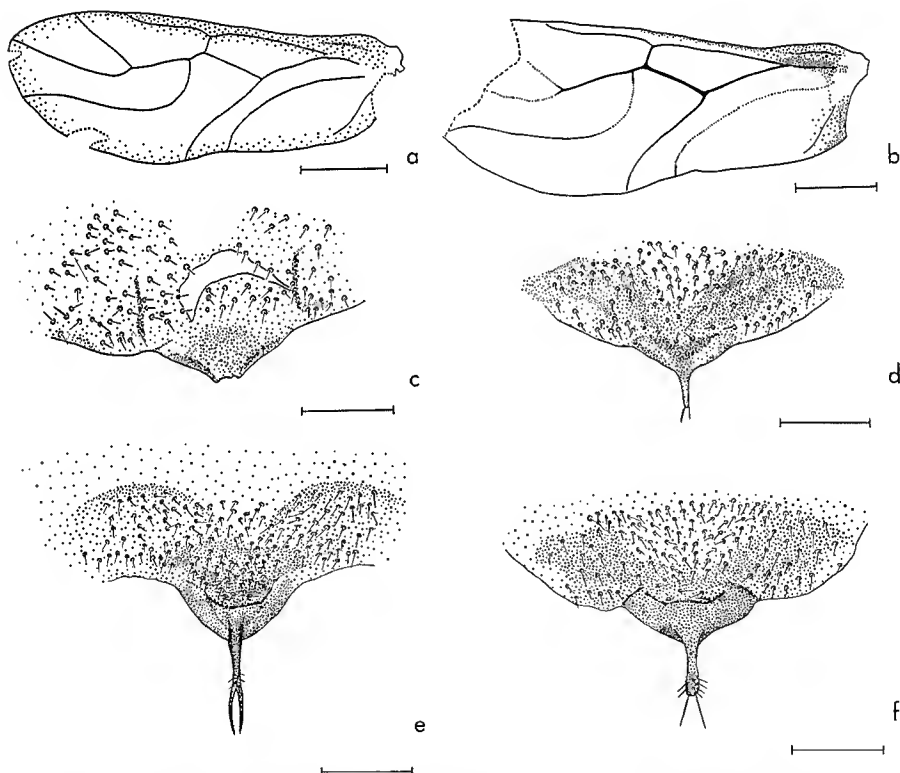


FIGURE 25.—Hindwing (female): **a**, *Myopsocus punctatus*; **b**, *M. palauensis*; female subgenital plate: **c**, *Lophopterygella cincticornis*; **d**, *M. clunius*; **e**, *M. palauensis*; **f**, *M. punctatus*. Scales a-b = 0.5 mm; c-f = 0.2 mm.

straight setae apically, disc distinctly sclerotized. Gonapophyses (fig. 26, d). A field of 20 trichobothria on each paraproct.

Body length (after softening, in alcohol): 2.0 mm.

MALE: Coloration (after c. 24 years dry storage). As female.

Morphology. I.O.: D. = 0.8: 1. Basal hind tarsal segment with 19 ctenidiobothria, Pearman's organ present. Genitalia: hypandrium (fig. 27, c) simple, with an apical sclerotized flap, a subapical pair of very long setae, a similar seta each side of hypandrium close to a field of smaller setae. Penis frame (fig. 27, e). Epiproct dorsally with a pair of projecting processes posterior to a raised spinous area. A field of 21 trichobothria on each paraproct, apical hook (fig. 27, g) narrow, sclerotized on mesial edge, bare at apex.

Body length (after softening in alcohol): 1.9 mm.

Holotype, ♀ (KU), Pata I., Truk, Caroline Is., Sabote-Epin, Apr. 9, 1940, Yasumatsu and Yoshimura. Allotype, ♂ (KU), Truk, Pata I., Sabote, Apr. 4, 1940, Yasumatsu and Yoshimura. Paratypes, Saipan: Garapan-Sadog Tasi, May 5, 1940, Yasumatsu and Yoshimura; As Mahetog area, at light, May 1-6, 1945, Dybas. Additional specimen, Truk: Moen I., Teroken, 70-60 m, Feb. 1, 1953, Gressitt.

DISTRIBUTION: S. Mariana Is. (Saipan); Caroline Is. (Truk).

This species is clearly related to *M. incomptus* Smithers and *M. furcatus* Smithers from Australia, which have the same type of penis frame and epiproct ornamentation. *Phlotodes griseipennis* (McLachlan) and *M. hickmani* Smithers, also from Australia, are apparently also related, though more distantly, to this group of forms, as is the only extra-Australian representative so far described, *Rhaptoneura eatoni* (McLachlan) from North Africa and Europe.

The specimens from Saipan differ in some ways from those captured on Truk. The Saipan male has narrower wings and different wing pattern (fewer brown spots), while one of the Saipan females has but a single seta on the apical process of the subgenital plate, the wings being as those of the females from Truk. Whether these differences warrant a subspecific separation of the Truk and Saipan forms cannot be decided on the basis of the few specimens available at the present time.

83. *Myopsocus palauensis* Thornton, Lee & Chui, n. sp. (fig. 24, c; 25, b, e; 26, b, e; 27, a, d, h)

FEMALE: Coloration (after c. 10 years dry storage). Vertex with irregular brown markings dorsally, fewer anteriorly, an isolated median small brown mark posterior to ocellar protuberance and about same size, a line of merging spots from orbit towards ocellar protuberance. Frons similarly mottled with brown marks, brown round antennal bases, line of merging brown spots from posterior edge of antennal socket towards ocellar protuberance fusing with similar line on vertex, another line from anterior edge of antennal socket along fronto-clypeal suture. Clypeus pale, converging striae discernible antero-laterally. Labrum dark brown. Genae pale, mottled brown particularly near sutures. Eyes grey, mottled with small dark brown marks which tend to form irregularly bent antero-posterior lines. Ocelli pale, dark brown inner margins. Maxillary palp pale, apical segment wholly dark brown. Antennae buff, two basal flagellar

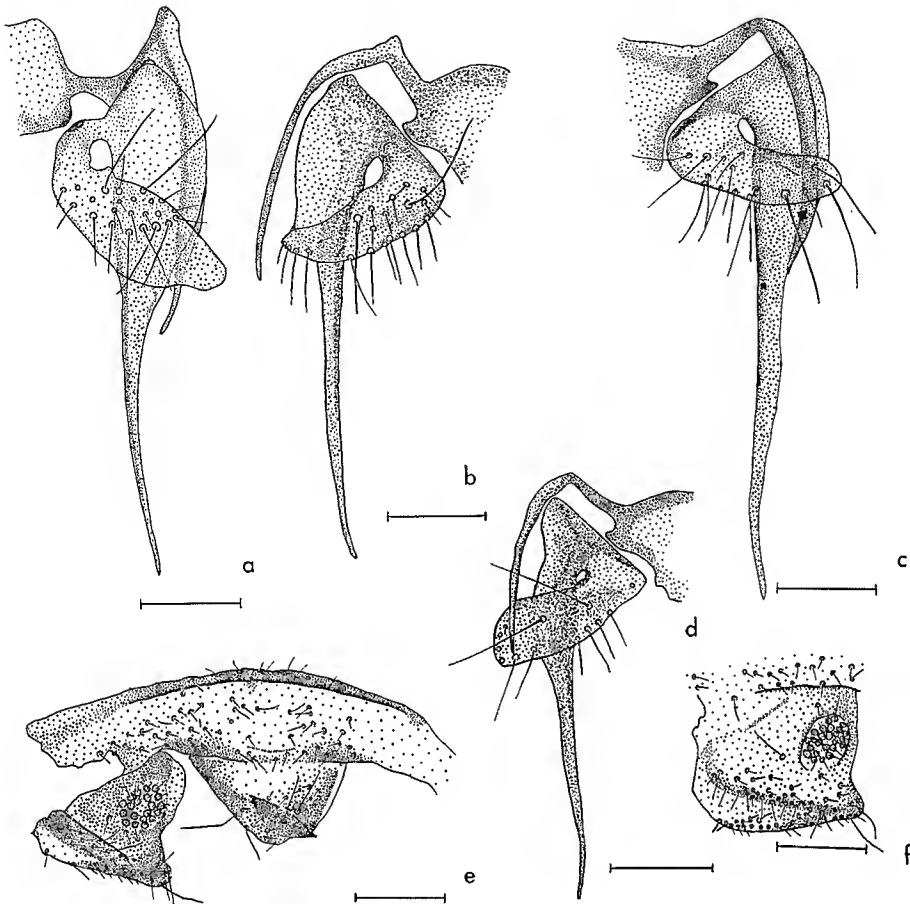


FIGURE 26.—Female gonapophyses: **a**, *Lophopterygella cincticornis*; **b**, *Myopsocus palauensis*; **c**, *M. punctatus*; **d**, *M. clunius*; ninth abdominal tergite, epiproct and paraproct of female: **e**, *M. palauensis*; paraproct of female: **f**, *L. cincticornis*. Scales a–c, e = 0.1 mm; d, f = 0.2 mm.

segments dark brown for apical sixth of their lengths, third and fourth very pale basally, darker sub-basally and apically, succeeding segments dark except for basal pale stretch. Thoracic terga pale brown, except anterior of mesothoracic antedorsum and dorsal lobes dark brown. Pleura brown. Legs: pro- and meso-femora with three brown transverse bands, hind femur with but one subapically; tibiae brown, very dark brown apically; basal tarsal segment pale brown, dark brown apically except on hind tarsus, distal tarsal segments dark brown. Forewing (fig. 24, c) mottled in various shades of brown, extent of hyaline areas in apical half of wing somewhat variable. Hindwing (fig. 25, b) very pale fuscous, costa with light and dark stretches. Abdominal color not discernible.

Morphology. I.O.: D. = 1.8: 1. Basal hind tarsal segment with 23 ctenidiobothria; claws sharply bent with preapical tooth a long way from apex; Pearman's organ present. Forewing venation as figured. Subgenital plate (fig. 25, e) apical process with a few short sharp

setae sub-distally, two long curved setae distally. Gonapophyses (fig. 26, b). A field of 21–22 trichobothria on each paraproct, apical hook (fig. 26, e) narrow, serrate on mesial surface, with minute setae at apex.

Body length (after softening, in alcohol): 2.3 mm.

Male: Coloration (after c. 10 years dry storage). As female except pterostigma in forewing somewhat darker, and hyaline patches in apical half of forewing less extensive.

Morphology. I.O.: D. = 0.5: 1, eyes very large. Basal hind tarsal segment with 21 ctenidiobothria; claws as female; Pearman's organ present. Genitalia: hypandrium (fig. 27, a) fairly simple, but with minute tubercles posteriorly, a larger pair in middle of posterior margin. Penis frame (fig. 27, d) of an unusual shape for this family. Epiproct beset with small tubercles as those on hypandrium (fig. 27, h). Paraproct (fig. 27, h) with a field of 20 trichobothria.

Body length (after softening, in alcohol): 2.0 mm.

Holotype, ♀ (BISHOP 9534), Caroline Is., Palau, Koror, Mar. 1954, Beardsley. Allotype, ♂ (US), Palau, Koror, Apr. 22, 1957, Sabrosky. Paratypes, Palau: Peleliu, Mt. Amiangal, Dec. 22, 1952, Gressitt; Auluptugal, NW, 25 m, light trap, Dec. 13, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau).

This species is similar in subgenital plate to *Phlotodes angolensis* Badonnel, from Africa; although the penis frame is quite different, the hypandria of the two species also show marked similarities. A species with a penis frame of a somewhat similar type occurs in Fiji.

84. *Myopsocus punctatus* Thornton, Lee & Chui, n. sp. (fig. 24, d; 25, f; 26, c; 27, b, f, i)

FEMALE: Coloration (after c. 20 years alcohol storage). Vertex mottled with brown marks, these darker and closer each side of median suture. Frons with a narrow curving line from each side of ocellar protuberance to a dark spot postero-mesial to antennal socket, a short dark transverse line just anterior to this dark spot, two fainter spots medially near anterior border of frons. Clypeus with convergent striae of confluent spots. Gena with angular brown line from underside of orbit to anterior edge of antennal socket, rest of gena mottled brown, except in distal quarter. Eyes grey with dark brown mottling, ocelli heavily margined dark brown on inner edges. Antenna pale brown, each flagellar segment with a short paler section extremely distally. Maxillary palps pale brown, apical segment darker in distal half. Thoracic terga brown, broad pale buff arrow-head mark on antedorsum of mesothorax, other terga widely bordered buff. Pleura of mesothorax pale brown, those of metathorax buff. Legs pale buff, except tibia darker distally, two distal tarsal segments brown. Forewing (fig. 24, d) very similar to that of *Myopsocus palauensis* in apical half, but differs in shape of the dark oblique transverse band in basal half. Abdomen with grey-brown dorsal and lateral bands, much fainter ventral bands.

Morphology. I.O.: D. = 2.0: 1. Basal hind tarsal segment with 21 ctenidiobothria; claws with prominent preapical tooth; Pearman's organ present. Subgenital plate (fig. 25, f) apical process with a pair of straight fairly short setae apically, beset with shorter finer straight setae subapically. Gonapophyses (fig. 26, c). A field of 21 trichobothria on each paraproct.

Body length (in alcohol): 2.6 mm (3 specimens, 2.5–2.8 mm).

MALE: Coloration (after c. 20 years alcohol storage). As female, but abdominal bands not visible dorsally.

Morphology. I.O.: D. = 1.0: 1. Basal hind tarsal segment with 18–20 ctenidiobothria;

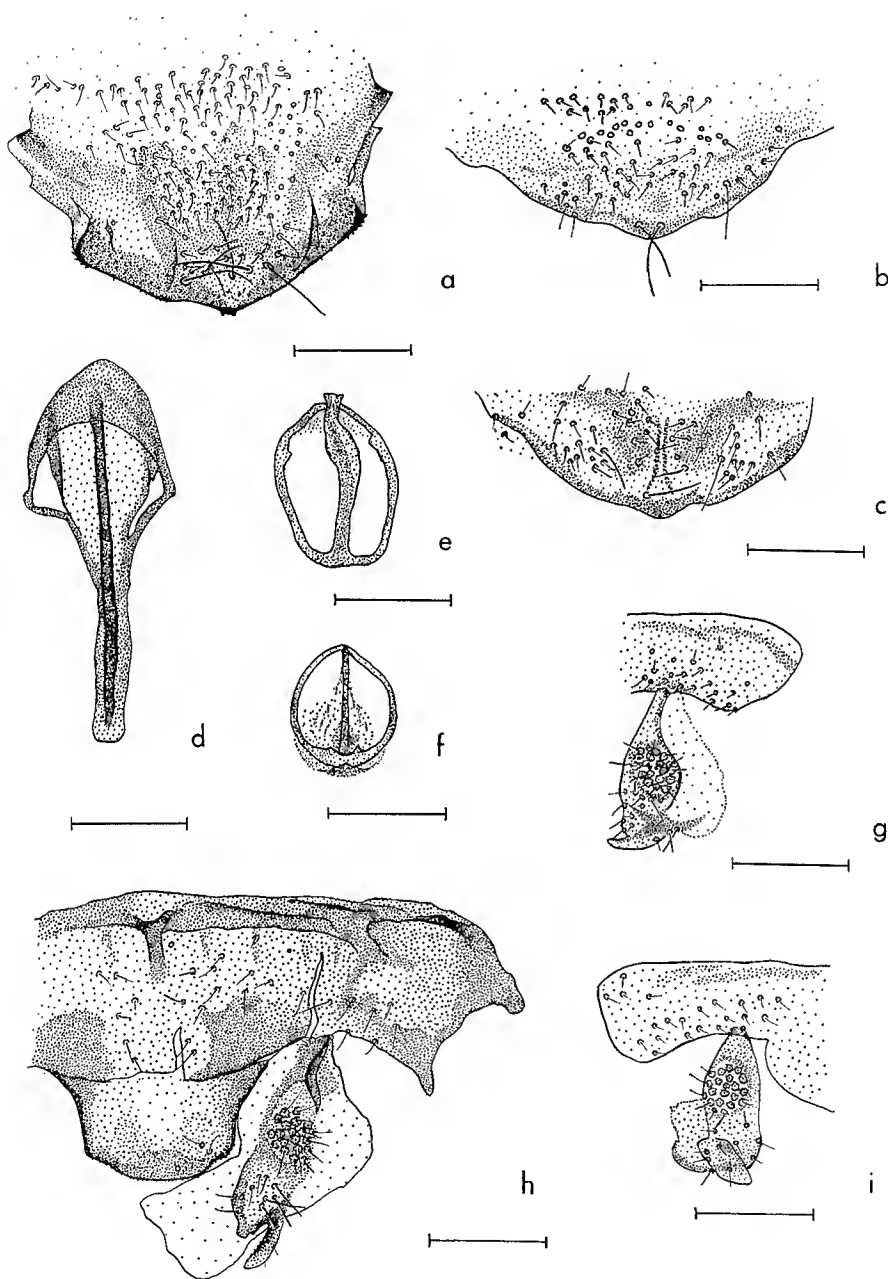


FIGURE 27.—Hypandrium: **a**, *Myopsocus palauensis*; **b**, *M. punctatus*; **c**, *M. clunius*; penis frame: **d**, *M. palauensis*; **e**, *M. clunius*; **f**, *M. punctatus*; male terminalia: **g**, *M. clunius*; **h**, *M. palauensis*; **i**, *M. punctatus*. Scales = 0.2 mm.

claws and Pearman's organ as female. Genitalia: hypandrium (fig. 27, b) with a median and each side a lateral shallow rounded lobe, a pair of long setae on median lobe, a field of short setae and one long one in association with each lateral lobe. Penis frame (fig. 27, f). Epiproct without dorsal processes. A field of 23 trichobothria on each paraproct, apical hook (fig. 27, i) broad, bare at tip.

Body length (in alcohol): 2.2 mm (3 specimens, 2.0–2.3 mm).

Holotype, ♀ (FM), Mariana Is., Saipan, hills E. of Garapan, beating, Jan. 23, 1945, Dybas. Allotype, ♂ (FM), same data. Paratypes, Saipan: Halaihai-As Teo area, Jan. 8, 1945, Dybas; Papago area, beating, Jan. 17–18, 1945, Dybas; Mt. Tagpochau, 1610 m, NNE of summit, beating, Jan. 18, 1945, Dybas; As Mahetog area, beating, Jan. 19, 1945, Dybas; near Garapan, beating, Jan. 19, 1945, Dybas; Kalabera area, Jan. 28, 1945, Dybas; Halaihai-As Teo area, Feb. 4, 1945, Sadog Talofofo area, beating, Feb. 9, 1945, Dybas; SW Saipan, May 7, 1945, Dybas. Tinian: Lake Hagoi, beating, Apr. 4, 1945, Dybas. Guam: Anderson A.F. base, Aug. 1952, Krauss. Additional specimens, Lamotrik: Lamotrik I., Feb. 5, 1953, Jaluit: Enybor I., malaise trap, Nov. 10–12, 1964, Perkins.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian, Guam), Caroline Is. (Lamotrik), Marshall Is. (Jaluit).

This species can be distinguished from the other two described in this work on the general pattern of the basal half of the forewing. Although there is variation of the detailed shape of the dark oblique band within the species, its general shape is constant, and differs from each of the other species. The genitalia are quite distinct, though closest to those of *Myopsocus clunius*, the male genitalia in particular resembling the Australian forms mentioned under that species. A species with very similar male genitalia occurs in Fiji.

FAMILY PSOCIDAE Stephens, 1892

CHARACTERISTICS: In forewing areola postica fused to media, gonapophyses complete and well developed; hypandrium of male often complex; tarsi 2-segmented.

Genus *Ptycta* Enderlein

Ptycta Enderlein, 1925, Konowia 4: 102. —Roesler, 1944, Stettin. Ent. Ztg. 105: 144. —Thornton, 1960, Trans. R. Ent. Soc. Lond. 112 (10): 248.

KEY TO MICRONESIAN SPECIES OF PTYCTA

1. Cells *R* and *Cu* in forewing without brown patches.....2
- Cells *R* and *Cu* in forewing with brown patches.....3
2. Thoracic terga very dark brown, shining.....89. **nitens**
- Thoracic terga pale brown, not shining.....85. **angulata**
3. Forewing with brown pigment over *rs-m* junction.....90. **parvula**
- Forewing *rs-m* junction without pigment.....4

4. Apical vein (*m*) of discoidal cell of forewing without pigmented cloud, transverse fascia almost continuous.....**87. *marianensis***
 Apical vein (*m*) of discoidal cell of forewing with pigmented cloud, transverse fascia interrupted5
5. Forewing with a cloud of brown pigment across cell *M*₁ near margin, pterostigma with brown pigment within its borders except at vertex, more than half its area pigmented.....**86. *maculata***
 Forewing without a cloud of brown pigment across cell *M*₁, pterostigma only pigmented in distal quarter.....**88. *micromaculata***

85. *Ptycta angulata* Thornton, Lee & Chui, n. sp. (fig. 28, *e*; 29, *b*; 30, *b*; 31, *b*; 32, *f*)

FEMALE: Coloration (after *c.* 20 years storage in alcohol). Head generally cream, brown vertex markings sparse, median epicranial suture dark; an inverted brown chevron in middle of frons, a brown line from antennal socket to ocellar protuberance, a short brown transverse line each side of median chevron. Clypeal striae very faint, darker for a short section forming a transverse band across clypeus. Eyes black; ocelli pale, dark brown inner margins. Antennae pale brown, maxillary palps cream. Thoracic terga pale brown, widely bordered cream, except anterior face of mesothoracic antedorsum dark brown. Pleura pale brown. Legs: coxa and apical tarsal segment pale brown, otherwise cream. Forewing (fig. 28, *e*) with small discreet brown patches, hindwing hyaline. Abdomen cream, diffuse grey-brown granulated pigment laterally.

Morphology I.O.: D. = 3.5: 1. Thoracic terga not shining. Number of ctenidiobothria on hind tarsal segments: 20; 2 + 1. Pearman's organ complete. Subgenital plate (fig. 30, *b*) with narrow straight bands of sclerotization on disc. Gonapophyses (fig. 29, *b*): ventral valve very short; dorsal valve narrow, tapering throughout its length; outer valve without a posterior lobe.

Body length (in alcohol): 1.8 mm (10 specimens, 1.5–2.1 mm).

MALE: Coloration (after *c.* 15 years alcohol storage). As female.

Morphology. I.O.: D. = 1.0: 1. Thoracic terga and Pearman's organ as female. Number of ctenidiobothria on hind tarsal segments: 22; 2 + 1. Genitalia: hypandrium (fig. 32, *f*) asym-

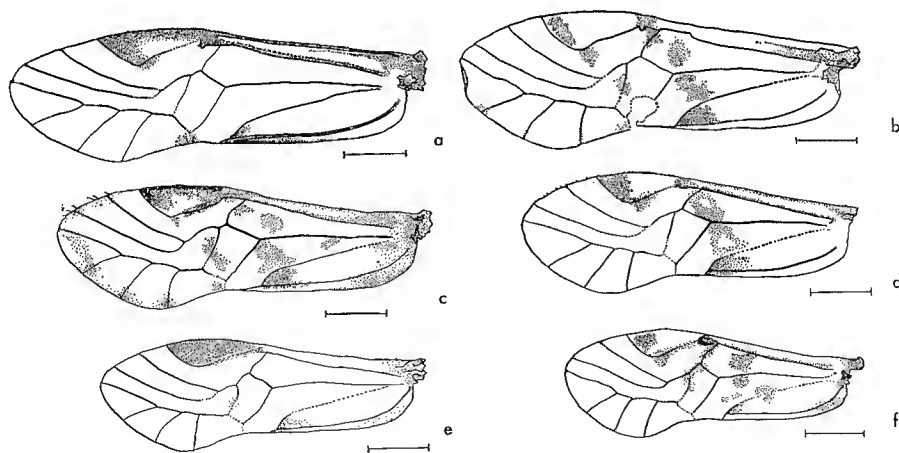


FIGURE 28.—Forewing: *a*, *Ptycta nitens*; *b*, *P. micromaculata*; *c*, *P. maculata*; *d*, *P. marianensis*; *e*, *P. angulata*; *f*, *P. parvula*. Scales = 0.5 mm.

metrical, median tongue with three distinct teeth on right margin, two on left. Penis frame (fig. 31, b) broad and angular anteriorly, posterior tine short. A field of 22 trichobothria and an apical, abruptly hooked spine on each paraproct. Posterior dorsal lobe of epiproct very finely tuberculate.

Body length (in alcohol): 2.2 mm (10 specimens, 2.0–2.4 mm).

Holotype, ♀ (US 71421), Mariana Is., Saipan, Jun. 1951, R.M. Bohart. Allotype, ♂ (BISHOP 9535), same data. Paratypes, Saipan: Laulau Bay area, beating, Nov. 25, 1944; As Mahetog area, beating, and Laulau Bay area, Dec. 1944; As Mahetog area, Dec. 12, 1944, Dec. 25, 1944; Jan. 1945; Tuteuram, Laulau Bay, Jan. 5, 1945; As Mahetog area, Jan. 6, 1945; Halaihai-As Teo area, beating, Jan. 7, 8, 1945; Papago area, beating, Jan. 17, 1945; As Mahetog area, beating, Jan. 19, 20, 1945; Near Garapan, beating, Jan. 19, 1945; Tuteuram, Laulau Bay, beating, Jan. 22, 1945; hills E. of Garapan, beating, Jan. 23, 1945; Chalan Laulau area, beating, Jan. 24, 1945; As Mahetog area, Jan. 26, 1945; Kalabera area, Jan. 28, 1945; Sadog Talofoto, Talofoto area, beating, Feb. 9, 1945; marsh N. of Garapan, Mar. 3, 1945; Apr. 17, 1945; SW Saipan, May 7, 1945; all by Dybas. Tinian: Apr. 1945, Dybas; Lake Hagoi, beating, Apr. 4, 1945, Dybas; NE slope Mt. Lasso, beating, Apr. 14, 1945, Dybas. Guam: Sumay, on *Heritiera*, Jun. 21, 1936, Swezey; Mt. Machanao, dead leaves of fallen tree, Jun. 5, 1936, Usinger. Eniwetok: Igurin I., Aug. 20, 1956. Kusaie: hill 1010, 300 m, Feb. 4, 1953, Clarke; Mutunlik, 22 m, Mar. 21, 1953, Clarke. Additional specimens, Majuro: Jun. 26, 1950, La Rivers. Taka: Watwerok I., under *Messerschmidia* bark, Dec. 9, 1951, Fosberg. Ujae: Bock I., at light, Feb. 17–20, 1952, Fosberg; Alle I., under loose bark of dead sapling in *Pisonia* grove, Mar. 10, 1952, Fosberg. Jaluit: Jabor I., *Erythrina*, May 1, 1958, Gressitt.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian, Guam), Caroline Is. (Eniwetok, Kusaie), Marshall Is. (Majuro, Taka, Ujae, Jaluit).

This rather pale species, which has quite distinctive genitalia, occurs in the S. Marianas, and in the eastern Carolines and Marshalls, but has not been taken on the high islands of the West or Central Carolines.

86. *Ptycta maculata* Thornton, Lee & Chui, n. sp. (fig. 28, *c*; 29, *d*; 30, *d*; 31, *e,h*; 32, *d*)

FEMALE: Coloration (after *c.* 15 years dry storage). Head cream, usual vertex marks faint brown. A brown line along vertex-frons suture from ocellar protuberance to antennal socket. Frons with large triangular median brown patch. Clypeal striae faint. No markings discernible on genae. Eyes black; ocelli pale, not with dark margins. Antennae lacking. Maxillary palp pale except apical segment dark brown. Thoracic terga brown, darker on anterior face of mesothorax. Pleura brown. Forewing (fig. 28, *c*) with numerous dark brown patches, apices of veins cloudy, a cloud of brown pigment across cell *M*₁ near margin. Hindwing hyaline, faint cloudiness in apical angle of cell *Cu*₂. Legs: coxa and apical tarsal segment dark brown, basal tarsal segment brown; tibia very pale brown, brown apically; femur cream, pale brown on

outer apex; trochanter cream. Abdominal color not discernible.

Morphology. I.O.: D. = 3.0: 1. Hindwing with 4 fine marginal setae. A very short spur-vein at vertex of pterostigma. Number of ctenidibothria on hind tarsal segments: 22; 2 + 1. Pearman's organ complete. Subgenital plate (fig. 30, d). Gonapophyses (fig. 29, d) with outer valve having small distinctively shaped posterior lobe. Spermapore plate (fig. 29, d) well sclerotized. A circular field of 21 trichobothria and 3 setae not in rosette sockets on each paraproct.

Body length (in alcohol): 2.4 mm.

MALE: Coloration (after c. 15 years dry storage). As female, but brown patches on forewing less extensive.

Morphology. I.O.: D. = 1.2: 1. Hindwing with 2 or 3 fine marginal setae. Spur-vein on pterostigma very short or lacking. Number of ctenidiobothria on hind tarsal segments: 20–21, 2 + 1. Pearman's organ complete. Genitalia: hypandrium (fig. 32, d) symmetrical, three widespread stout pointed teeth each side of median tongue, apical one stoutest and bluntest, beyond this two or three smaller close-set serrations. Penis frame (fig. 31, e) rounded anteriorly, tapering evenly posteriorly to wide, blunt, apical line beset with minute pointed tubercles. A field of 17–18 trichobothria and an evenly curved apical spine on each paraproct. Dorsal lobe of epiproct (fig. 31, h) with distinct sclerotized boundaries, the posterior one finely tuberculate.

Body length (in alcohol): 1.9 mm.

Holotype, ♀ (US 71420), Caroline Is., Ponape, Ag. Exp. Stn., Jun.–Sep. 1950, Adams. Allotype, ♂ (US), same data. Paratypes, Ponape: Mt. Dolenankap, 520–920 m, Aug. 10, 1946; Mt. Beirut, Jun.–Sep. 1950, Adams.

DISTRIBUTION: Caroline Is. (Ponape).

This distinctive species is apparently confined to Ponape. The hypandrium somewhat resembles that of *Ptycta parvula* but the penis frame and wing pattern are quite different.

87. *Ptycta marianensis* Thornton, Lee & Chui, n. sp. (fig. 28, d; 29, c; 30, e; 31, c, g; 32, c)

FEMALE: Coloration (after c. 20 years alcohol storage). Head generally cream, usual vertex marks faint. Frons with grey-brown band along anterior and posterior sutures. Clypeal striae very pale. Genae cream. Eyes black; ocelli pale with dark brown inner margins. Basal three segments of antenna cream, rest light brown. Maxillary palps cream.

Thoracic terga brown, dark brown on anterior face of mesothorax, margined cream, scutella cream. Pleura light brown. Legs: coxa light brown, tarsal segments brown, otherwise cream. Forewing (fig. 28, d) with a complete transverse brown fascia. Hindwing hyaline. Abdomen whitish cream, narrow median and broad lateral longitudinal dark grey-brown bands.

Morphology. I.O.: D. = 4.0: 1. Thoracic terga shining, particularly anterior of mesothorax. Number of ctenidiobothria on hind tarsal segments: 23; 2 + 1. Pearman's organ complete. Hindwing with 6 short marginal setae. Subgenital plate (fig. 30, c) with divergent sclerotized bands on disc widening posteriorly. Gonapophyses (fig. 29, c): ventral valve fairly long; outer valve with short posterior lobe. Spermapore plate well sclerotized. A field of 20 trichobothria on each paraproct.

Body length (in alcohol): 2.3 mm.

MALE: Coloration (after c. 20 years alcohol storage). As female, but pigmented fascia lacking in forewing.

Morphology. I.O.: D. = 2.0: 1. Thoracic terga as female. Number of ctenidiobothria

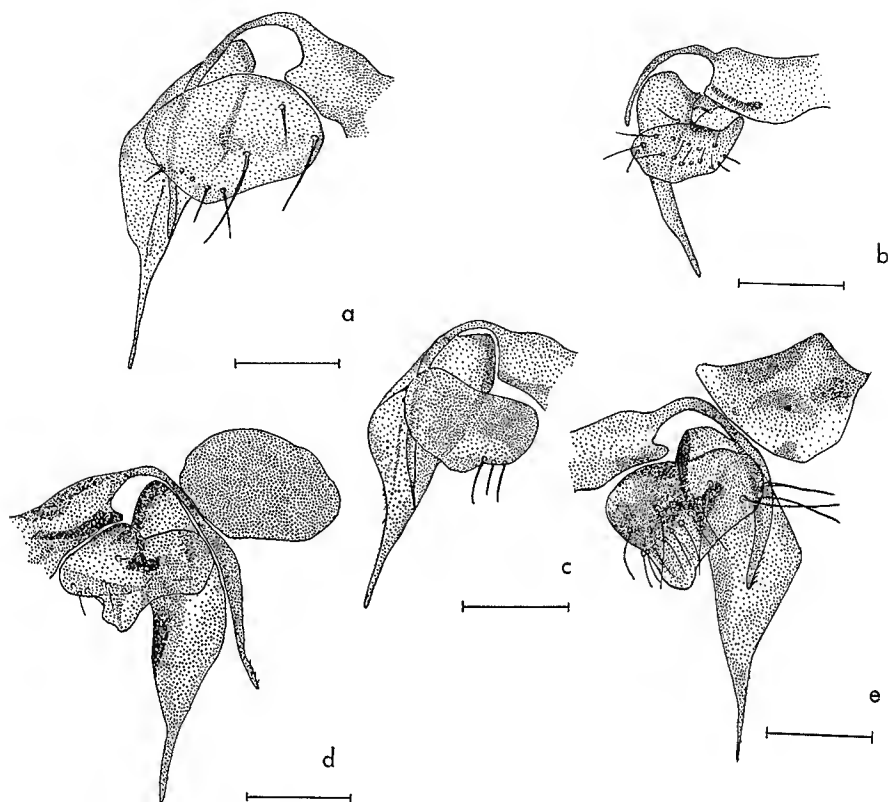


FIGURE 29.—Female gonapophyses: a, *Ptycta nitens*; b, *P. angulata*; c, *P. marianensis*; d, *P. maculata*; e, *P. micromaculata*. Scales = 0.1 mm.

on hind tarsal segments: 21-22; 2 + 1. Pearman's organ complete. Hindwing with 5-6 stout marginal setae. Genitalia: hypandrium (fig. 32, c) symmetrical, median tongue with many marginal teeth. Penis frame (fig. 31, c) wide and rounded anteriorly, narrowing posteriorly to a fairly long, broad apical tine. A field of 21 trichobothria and a long, fairly straight spine on each paraproct. Posterior lobe of epiproct with fairly large tubercles (fig. 31, g).

Body length (in alcohol): 2.1 mm (10 specimens, 1.8-2.4 mm).

Holotype, ♀ (FM), Mariana Is., Saipan, Halaihai-As Teo area, beating, Jan. 7, 8, 1945, Dybas. Allotype, ♂ (FM), same data. Paratypes, Saipan: Garapan-Sadog area, May 3-5, 1940, Yasumatsu and Yoshimura; As Mahetog area, Dec. 12, 1944, Dybas; Papago area, beating, Jan. 17, 1945, Dybas; As Mahetog area, beating, Jan. 19, 1945, Dybas; hills E. of Garapan, beating, Jan. 23, 1945, Dybas; Chalan Laulau area, beating, Jan. 24, 1945, Dybas; Mt. Tagpochau, 375 m. Feb. 18, 1945, Dybas; Jun. 1951, R.M. Bohart. Tinian: Mar. 16-30, 1945, Dybas. Guam: Mt. Lamlam, Feb. 1958, Krauss; Yigo, Feb. 1958, Krauss.

DISTRIBUTION: S. Mariana Is. (Saipan, Tinian, Guam).

88. *Ptycta micromaculata* Thornton, Lee & Chui, n. sp. (fig. 28, b; 29, e; 30, e; 31, f, i; 32, e)

FEMALE: Coloration (after c. 7 years alcohol storage). Head largely buff, usual markings on vertex and frons brown, clypeal striae very faint except medially, forming darker band in mid-line of clypeus. Eyes black; ocelli with dark brown inner borders. Antennae pale brown; maxillary palps brown, apical segment darker. Thoracic terga pale, anterior of mesothoracic antedorsum and posteromedial portion of dorsal lobes brown, dorsal lobes of metathorax with more extensive brown pigment. Pleura brown. Legs: pale brown apart from brown coxae. Forewing (fig. 28, f) with small discreet brown patches. Hindwing faintly infusate at distal angle of cell Cu_2 . Abdomen buff, grey-brown granulation dorsally.

Morphology. I.O.:D. = 3.5:1. Thoracic terga dull. Number of ctenidiobothria on hind tarsal segments: 22; 2 + 1. Pearman's organ complete. Subgenital plate (fig. 30, e) apical lobe as broad as long, sclerotized area of disc narrow. Gonapophyses as in fig. 29, e. Spermapore plate (fig. 29, e) with sclerotized anterior folds. A field of 21 trichobothria on each paraproct.

Body length (in alcohol): 2.5 mm.

MALE: Coloration (after c. 14 years alcohol storage). Not distinguishable, faded, except forewing marked as female.

Morphology. I.O.:D. = 1.0:1. Thoracic terga dull. Number of ctenidiobothria on hind tarsal segments: 20; 2 + 1. Pearman's organ complete. Genitalia: hypandrium with toothed margin to median tongue (fig. 32, e). Penis frame (fig. 31, f) with fairly long apical projection. A field of 22 trichobothria and a large curved spine on each paraproct. Posterior lobe of epiproct only sparsely and finely spinous (fig. 31, i).

Body length (in alcohol): 1.5 mm, smaller than female.

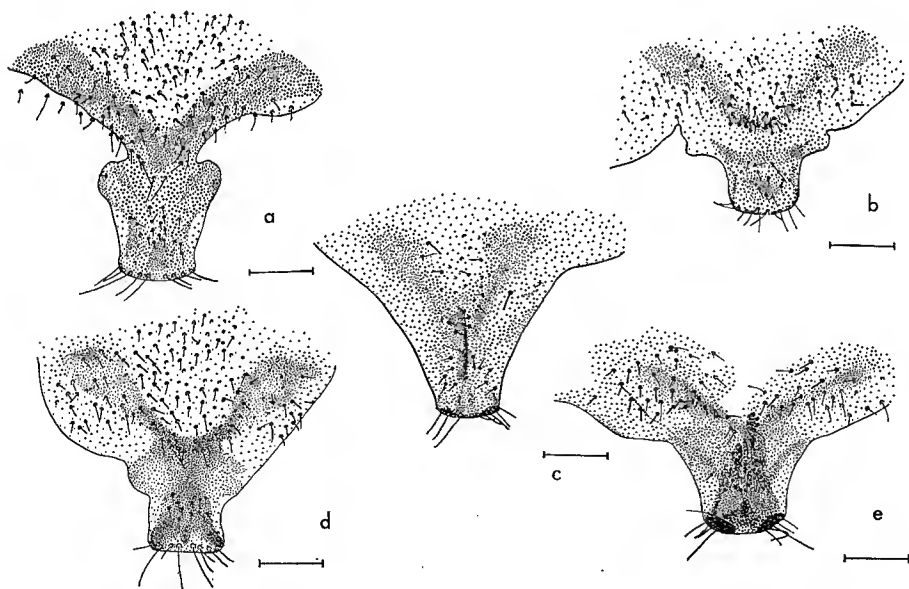


FIGURE 30.—Female subgenital plate: a, *Ptycta nitens*; b, *P. angulata*; c, *P. marianensis*; d, *P. maculata*; e, *P. micromaculata*. Scales = 0.1 mm.

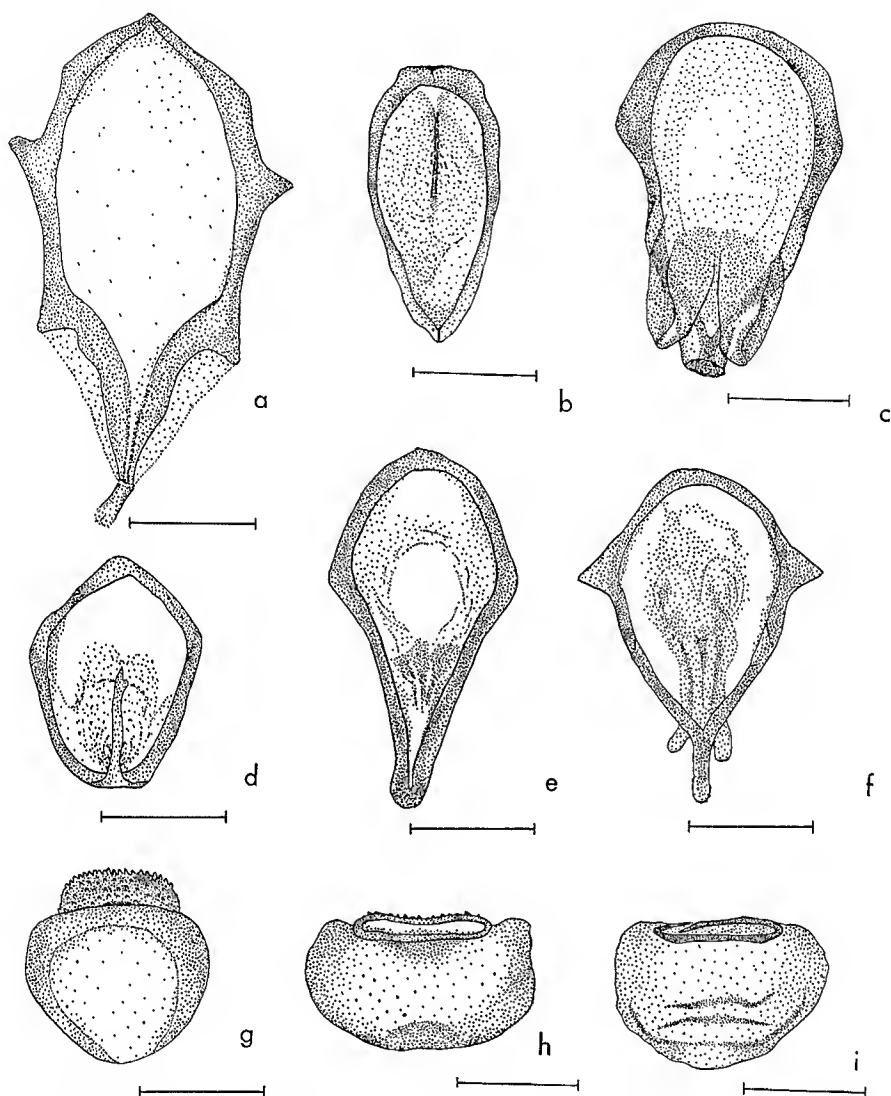


FIGURE 31.—Penis frame: **a**, *Ptycta nitens*; **b**, *P. angulata*; **c**, *P. marianensis*; **d**, *P. parvula*; **e**, *P. maculata*; **f**, *P. micromaculata*; epiproct ornamentation of male: **g**, *P. marianensis*; **h**, *P. maculata*; **i**, *P. micromaculata*. Scales = 0.1 mm.

Holotype, ♀ (US 71419), Bonin Is., Chichi Jima, Omura, "Camp Beach", Apr. 1958. Allotype, ♂ (US), Chichi Jima, Jul. 10, 1951, R.M. Bohart. Paratype, Chichi Jima: "Bull Beach", Aug. 5.

DISTRIBUTION: Bonin Is. (Chichi Jima).

This species is fairly distinctive in wing pattern, the markings being discreet

and well-marked. The female gonopore plate is quite different from that of any other Micronesian species.

89. *Ptycta nitens* Thornton, Lee & Chui, n. sp. (fig. 28, *a*; 29, *a*; 30, *a*; 31, *a*; 32, *a*, *b*)

FEMALE: Coloration (after *c.* 12 years dry storage). Vertex posteriorly brown, anteriorly creamy buff. Frons grey-brown. Clypeal striae fairly faint grey-brown, posterior edge of clypeus cream. Genae buff, brown marks below orbit. Eyes black; ocelli black, on cream protuberance. Antennae brown; maxillary palp buff, apical segment dark brown. Thoracic terga very dark brown, margined cream. Pleura brown. Forewing (fig. 28, *a*) with interrupted transverse brown fascia. Hindwing hyaline. Legs: coxa, tarsus, and apex of tibia dark brown; rest of tibia and apical fifth of femur brown, rest of femur and trochanter pale buff. Abdomen with grey-brown transverse bands dorsally, cream ventrally.

Morphology. I.O.: D. = 1.5: 1. Thoracic terga glossy. A short spur-vein at vertex of pterostigma. Hindwing with 4 to 7 fine marginal setae. Number of ctenidiobothria on hind tarsal segments: 26 to 27; 3 + 1 to 4 + 1. Subgenital plate (fig. 30, *a*). Gonapophyses (fig. 29, *a*); ventral valve fairly long; dorsal valve abruptly narrowing to fine pointed apex; outer valve with sharply truncate posterior lobe. A field of 23 trichobothria on each paraproct.

Body length (in alcohol, after softening): 1.5 mm.

MALE: Coloration (after *c.* 12 years dry storage). As female, but genae wholly yellowish buff.

Morphology. I.O.: D. = 0.6: 1. Thoracic terga and pterostigma as female. Hindwing with 2–8 fine marginal setae. Number of ctenidiobothria on hind tarsal segments: 25 to 28; 2 + 1 to 3 + 1. Genitalia: hypandrium (fig. 32, *a*) symmetrical, median tongue with fine, blunt, closely set marginal teeth, each side of this a sclerotized ridge bears a series of larger serrations (paratype, fig. 32, *b*). Penis frame (fig. 31, *a*) of distinctive shape, with prominent “shoulders” and a long lightly sclerotized apical tine bearing minute pointed spines. A field of 24 trichobothria and smoothly curved apical spine on each paraproct. Posterior lobe of epiproct closely set with fairly large pointed tubercles.

Body length (in alcohol): 1.4 mm.

Holotype, ♀ (KU), Caroline Is., Truk, Wela (Wena, Moen), Jul. 20, 1939, Kyushu University. Allotype, ♂ (BISHOP 9536), Palau, Koror, Jan. 1953, Beardsley. Paratypes, Palau: Koror, Sep. 1952, Beardsley; SW, Dec. 4, 1952, Dec. 11–18, 1952, Gressitt; Apr. 1957, Sabrosky; Ngerabad, May, 17, 1957; Babelthuap: Ngerehelong, at light, May 6–8, 1957. Truk: Tol I., Mt. Unibot 25–50 m, Dec. 31, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau, Truk).

This large species, easily distinguished by the very dark polished thorax is quite distinct in male genitalia and in the outer valve of the female gonapophyses from any other Micronesian species. In all specimens examined, a distinct spur-vein is present at the vertex of the pterostigma.

90. *Ptycta parvula* Thornton, Lee & Chui, n. sp. (fig. 28, *f*; 31, *d*; 32, *g*)

MALE: Coloration (after *c.* 8 years alcohol storage). Head markings not discernible. Antennae and maxillary palps lost. Eyes black; ocelli pale, dark brown inner margins. Thoracic terga brown, pleura brown. Legs: coxa, tarsal segments and distal end of tibia brown, other-

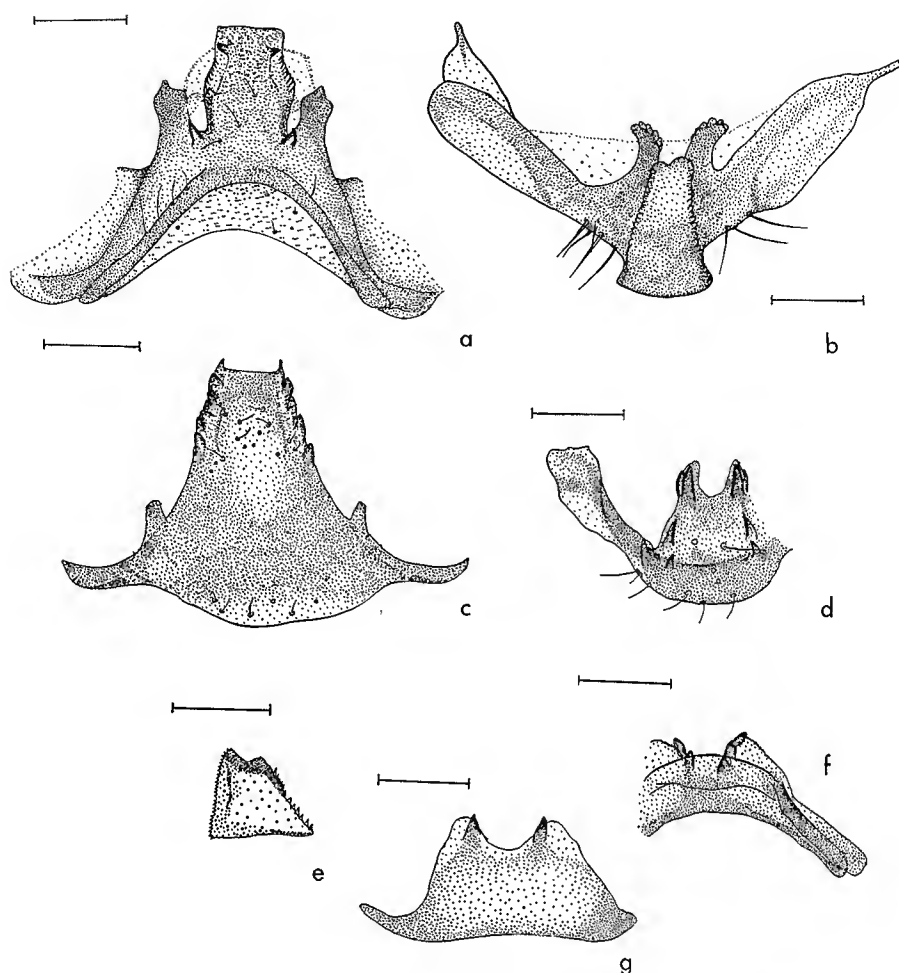


FIGURE 32.—Hypandrium: **a, b**, *Ptycta nitens*; **c**, *P. marianensis*; **d**, *P. maculata*; **e**, *P. micromaculata* (hypandrial tongue only); **f**, *P. angulata*; **g**, *P. parvula*. Scales = 0.1 mm.

wise pale buff. Forewing pattern as in fig. 28, f. Hindwing hyaline. Abdomen with sparse grey-brown granulations dorsally and ventrally.

Morphology. I.O.: D. = 0.8: 1. Number of ctenidiobothria on hind tarsal segments: 18; 2 + 1. Pearman's organ complete. Hindwing with 2 fine marginal setae apically. Genitalia: hypandrium (fig. 32, g) symmetrical, three prominent teeth on each margin of median tongue. Penis frame (fig. 31, d) angular basally, apical tine very short. A field of 19 trichobothria and a large abruptly hooked apical spine on each paraproct. Posterior dorsal epiproct lobe finely tuberculate.

Body length (in alcohol): 1.5 mm.

FEMALE: Unknown.

Holotype, ♂ (US 71422), Caroline Is., Palau, Babelthuap, Ngiwal, at light,

May 19, 1957, Sabrosky. Paratype, Guam: Merizo, Oct. 1957, Krauss.

DISTRIBUTION: S. Mariana Is. (Guam), Caroline Is. (Palau).

This small species is clearly similar to *Ptycta angulata* from the Marianas, Eastern Carolines and Marshalls; the male genitalia and wing patterns of the two species are very similar. *Ptycta parvula* may be distinguished by the rather more extensive wing markings, the brown thorax, and the symmetrical hypandrium.

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